CONVERSION TABLES FOR FLUORESCENT X-RAY SPECTROSCOPY

BY WILLIAM J. CAMPBELL AND JOHN G. PARKER

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William J. Campbell [1/] and John G. Parker [2/]

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INTRODUCTION

The possibility of chemical analysis by identification of characteristic X-ray spectral lines was first suggested by H. G. J. Moseley in 1913.3/ For a given spectral series it was found that the frequency of the characteristic radiation was proportional to the square of the atomic number of the excited atom. Siegbahn and his coworkers improved the instrumentation and accurately determined the wavelengths of the characteristic spectra for most of the elements.4/

In fluorescent X-ray spectroscopy, the characteristic X-rays of atoms are emitted or fluoresced upon absorption of primary or incident X-rays of shorter wavelengths (higher energies). The K spectral lines are used for elements of atomic numbers 13 to about 63, and the L series for those above atomic number 50. Whether the K or L lines are used for elements 50-63 depends upon the type of instrumentation available. The laboratory at the Eastern Experiment Station of the Bureau of Mines, College Park, Md., uses the K lines up to atomic number 57 and the L lines for those elements of higher atomic number.

USE OF SPECTRAL TABLES

The fluorescent X-ray spectrograph consists essentially of a source of primary X-radiation, a collimating system and an analyzing crystal for resolving the spectral lines, and suitable equipment for measuring and recording the intensity of these lines.

The fluorescent X-radiation from the sample is resolved into its component lines according to Bragg's law:

(1) $n\lambda = 2d \sin \theta$,
λ = wavelength of characteristic radiation,
d = interplanar spacing,
θ = angle between incident radiation and reflecting plane of crystal.

The samples to be analyzed can be divided into two general classes:

(A) Qualitative or quantitative analysis for a specific element or group of elements.

(B) The qualitative determination of all the elements comprising an unknown sample.

For the analyses of group A samples tables 1 through 6 were prepared. They consist of the 2θ values for any given characteristic wavelengths for three analyzing crystals of general use. For example, if the analyst wishes to determine

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3/ Moseley, H. G. J., The High-Frequency Spectra of the Elements: Phil. Mag., vol. 26, No. 156, 1913, p. 1024.

4/ Siegbahn, M., The Spectroscopy of X-rays: Oxford Press, 1925.

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whether or not copper is present, the detector is set at the listed 2θ value for the particular analyzing crystal used.

The analyses of group B samples are aided by using table 7. This table contains a listing of the characteristic lines, which will be found at a given 2θ value for each of the analyzers. For example, if a line is observed at 2θ = 55.78°, using a NaCl crystal, then the table shows it to be a characteristic line of strontium.

The analyzing crystals are the three found to be of general usefulness in this laboratory. The NaCl analyzer (2d = 5.394 A.) is useful for a wide range of analyses and is reasonably stable and the spectral lines are rather intense with medium line broadening. LiF (2d = 4.020 A.) has a strong reflecting power but a marked mosaic structure so that the lines are quite broad. The quartz crystal (2d = 3.636 A.) has excellent dispersion, narrow spectral lines, and stability, but it has a low coefficient of reflection. Also, with this crystal, higher order lines are greatly reduced. Therefore, the NaCl crystal is employed for general use; the LiF crystal when high intensity is desired; and the quartz crystal when more resolution is necessary.

Only those spectral lines found below 90° 2θ were calculated. Orders of reflection up to six are included. As the relative intensities of a group of lines, for example the L series of tungsten, are well established, the logical choice between the number of possible elements for a given 2θ value is readily made. This is particularly important when trace amounts are being determined.

The K series were computed for elements up to atomic number 63, above which more than 50 kv. is necessary for their excitation.

The calculations were made in duplicate with a standard desk calculator. The values were computed to ± 0.02° 2θ.

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TABLE 1. - K spectral lines of elements atomic numbers 19-63 NaCl analyzer (Degrees 2θ)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
19 K	1	83.22	83.12	75.54		
20 Ca	1	73.18	73.10	66.44		
21 Sc	1	65.12	65.02	59.06		
22 Ti	1	58.42	58.34	52.96		
23 V	1	52.80	52.70	47.80		
24 Cr	1	48.00	47.92	43.40		
25 Mn	1	43.86	43.76	39.60		
	2			85.28		
26 Fe	1	40.24	40.16	36.30		
	2	86.94	86.72	77.06		
27 Co	1	37.08	37.00	33.40		
	2	78.96	78.76	70.16		
28 Ni	1	34.28	34.20	30.86	30.62	
	2	72.22	72.02	64.28	63.74	
29 Cu	1	31.78	31.72	28.54	28.34	
	2	66.42	66.24	59.18	58.66	
30 Zn	1	29.56	29.48	26.56	26.32	
	2	61.38	61.18	54.70	54.16	
	3			87.10	86.14	
31 Ga	1	27.58	27.50	24.72	24.50	
	2	56.92	56.74	50.70	50.20	
	3			79.94	79.04	
32 Ge	1	25.78	25.70	23.10	22.84	
	2	52.98	52.80	47.20	46.66	
	3	83.98	83.66	73.82	72.88	
33 As	1	24.16	24.08	21.62	21.36	
	2	49.46	49.30	44.04	43.50	
	3	77.74	77.44	68.44	67.54	
34 Se	1	22.68	22.60	20.26	20.02	
	2	46.30	46.14	41.20	40.68	
	3	72.30	72.00	63.72	62.84	
	4			89.46	88.06	
35 Br	1	21.34	21.26	19.04	18.78	
	2	43.46	43.28	38.64	38.10	
	3	67.46	67.16	59.50	58.64	
	4			82.84	81.50	
37 Rb	1	18.98	18.90	16.90	16.66	16.90
	2	38.50	38.32	34.18	33.66	34.20
	3	59.28	58.98	52.32	51.48	52.36
	4	82.52	82.08	72.00	70.78	72.06
38 Sr	1	17.94	17.86	15.96	15.72	15.98
	2	36.34	36.16	32.24	31.74	32.26
	3	55.78	55.50	49.24	48.42	49.26
	4	77.20	76.76	67.46	66.28	67.52
	5			87.92	86.22	88.00

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TABLE 1. - K spectral lines of elements atomic numbers 19-63 NaCl analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
39 Y	1	17.00	16.90	15.10	14.84	15.10
	2	34.36	34.18	30.46	29.96	30.48
	3	52.60	52.32	46.40	45.62	46.44
	4	72.44	72.02	63.40	62.24	63.44
	5			82.10	80.48	82.18
40 Zr	1	16.12	16.04	14.30	14.06	14.30
	2	32.54	32.36	28.82	28.34	28.84
	3	49.72	49.44	43.84	43.06	43.88
	4	68.18	67.76	59.70	58.60	59.76
	5	88.94	88.34	76.94	75.42	77.02
41 Nb	1	15.30	15.20	13.56	13.32	13.58
	2	30.86	30.70	27.32	26.82	27.34
	3	47.06	46.78	41.48	40.74	41.52
	4	64.32	63.92	56.36	55.30	56.40
	5	83.42	82.84	72.34	70.88	72.44
	6				88.20	
42 Mo	1	14.56	14.46	12.88	12.64	12.88
	2	29.34	29.14	25.92	25.44	25.94
	3	44.66	44.34	39.32	38.58	39.34
	4	60.88	60.42	53.30	52.26	53.34
	5	78.58	77.94	68.20	66.80	68.26
	6			84.56	82.70	84.64
43 Tc	1	13.84	13.74	12.24	12.02	
	2	27.86	27.70	24.64	24.18	
	3	42.36	42.06	37.32	36.62	
	4	57.60	57.20	50.50	49.52	
	5	74.04	73.48	64.44	63.14	
	6			79.58	77.84	
44 Ru	1	13.18	13.10	11.66	11.44	11.66
	2	26.56	26.36	23.42	22.98	23.46
	3	40.30	40.02	35.46	34.78	35.50
	4	54.68	54.28	47.92	46.94	47.98
	5	70.06	69.52	61.02	59.72	61.08
	6	87.08	86.38	75.06	73.38	75.14
45 Rh	1	12.58	12.50	11.10	10.90	11.12
	2	25.30	25.12	22.32	21.88	22.34
	3	38.36	38.10	33.74	33.08	33.80
	4	51.96	51.58	45.54	44.60	45.58
	5	66.40	65.88	57.86	56.62	57.94
	6	82.16	81.46	70.98	69.40	71.06
46 Pd	1	12.00	11.92	10.60	10.38	10.60
	2	24.16	23.96	21.28	20.84	21.30
	3	36.58	36.30	32.16	31.50	32.18
	4	49.46	49.08	43.34	42.44	43.38
	5	63.06	62.54	54.98	53.80	55.04
	6	77.74	77.06	67.26	65.74	67.34

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TABLE 1. - K spectral lines of elements atomic numbers 19-63 NaCl analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
47 Ag	1	11.48	11.38	10.10	9.92	10.14
	2	23.08	22.88	20.30	19.90	20.34
	3	34.90	34.62	30.66	30.04	30.72
	4	47.14	46.76	41.28	40.42	41.34
	5	59.98	59.48	52.30	51.16	52.38
	6	73.72	73.06	63.84	62.42	63.94
48 Cd	1	10.98	10.90	9.66	9.46	9.68
	2	22.06	21.88	19.40	18.98	19.42
	3	33.34	33.08	29.28	28.64	29.32
	4	45.00	44.60	39.38	38.52	39.44
	5	57.14	56.64	49.80	48.72	49.90
	6	70.04	69.40	60.72	59.32	60.80
49 In	1	10.52	10.42	9.24	9.06	9.26
	2	21.12	20.92	18.56	18.16	18.58
	3	31.90	31.62	27.98	27.38	28.02
	4	42.98	42.60	37.62	36.80	37.66
	5	54.50	54.00	47.54	46.48	47.60
	6	66.66	66.02	57.84	56.52	57.92
50 Sn	1	10.08	9.98	8.86	8.66	8.86
	2	20.22	20.04	17.76	17.38	17.78
	3	30.54	30.26	26.78	26.18	26.80
	4	41.12	40.74	35.96	35.16	36.02
	5	52.08	51.58	45.40	44.36	45.46
	6	63.56	62.94	55.16	53.88	55.26
51 Sb	1	9.66	9.56	8.48	8.30	8.48
	2	19.40	19.20	17.02	16.64	17.02
	3	29.26	28.98	25.64	25.06	25.64
	4	39.36	38.98	34.42	33.64	34.42
	5	49.80	49.30	43.42	42.42	43.42
	6	60.70	60.06	52.70	51.44	52.70
52 Te	1	9.28	9.18	8.14	7.96	8.14
	2	18.60	18.42	16.32	15.94	16.32
	3	28.08	27.78	24.58	24.02	24.58
	4	37.72	37.34	32.98	32.22	32.98
	5	47.66	47.18	41.56	40.58	41.56
	6	58.02	57.40	50.40	49.20	50.40
53 I	1	8.92	8.82	7.82	7.64	7.82
	2	17.86	17.68	15.64	15.30	15.68
	3	26.94	26.66	23.56	23.06	23.62
	4	36.20	35.80	31.60	30.88	31.68
	5	45.70	45.20	39.80	38.88	39.88
	6	55.54	54.92	48.20	47.10	48.32

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TABLE 1. - K spectral lines of elements atomic numbers 19-63 NaCl analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
55 Cs	1	8.24	8.14	7.20	7.02	7.22
	2	16.52	16.32	14.44	14.10	14.46
	3	24.88	24.60	21.74	21.20	21.78
	4	33.38	33.00	29.10	28.40	29.18
	5	42.08	41.60	36.62	35.72	36.70
	6	51.04	50.42	44.30	43.18	44.40
56 Ba	1	7.92	7.84	6.92	6.76	6.94
	2	15.88	15.70	13.88	13.56	13.92
	3	23.92	23.64	20.90	20.40	20.94
	4	32.08	31.70	27.98	27.30	28.04
	5	40.42	39.92	35.18	34.32	35.24
	6	48.98	48.38	42.52	41.46	42.60
57 La	1	7.64	7.54	6.66	6.52	6.68
	2	15.30	15.10	13.36	13.04	13.38
	3	23.04	22.74	20.10	19.62	20.14
	4	30.88	30.50	26.90	26.26	26.96
	5	38.88	38.38	33.80	33.00	33.88
	6	57.06	46.46	40.84	39.84	40.94
58 Ce	1	7.36	7.26	6.42	6.26	6.44
	2	14.74	14.56	12.86	12.56	12.88
	3	22.18	21.90	19.34	18.88	19.38
	4	29.72	29.34	25.88	25.26	25.94
	5	37.40	36.92	32.52	31.72	32.60
	6	45.26	44.66	39.26	38.30	39.36
59 Pr	1	7.10	7.00	6.18	6.04	6.20
	2	14.20	14.02	12.38	12.08	12.42
	3	21.38	21.10	18.62	18.18	18.68
	4	28.64	28.26	24.92	24.32	24.98
	5	36.02	35.54	31.30	30.52	31.38
	6	43.56	42.96	37.78	36.82	37.86
60 Nd	1	6.84	6.74	5.96	5.82	5.98
	2	13.70	13.52	11.94	11.66	11.98
	3	20.62	20.34	17.96	17.52	18.00
	4	27.62	27.22	24.02	23.42	24.08
	5	34.72	34.22	30.14	29.42	30.22
	6	41.96	41.34	36.36	35.58	36.46
61 Pm	1	6.60	6.52	5.74		5.74
	2	13.22	13.06	11.48		11.48
	3	19.90	19.64	17.26		17.26
	4	26.64	26.30	23.08		23.08
	5	33.48	33.04	28.96		28.96
	6	40.44	39.90	34.94		34.94

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TABLE 1. - K spectral lines of elements atomic numbers 19-63 NaCl analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
62 Sm	1	6.38	6.28	5.56	5.42	5.56
	2	12.78	12.58	11.12	10.84	11.14
	3	19.22	18.92	16.70	16.28	16.74
	4	25.70	25.32	22.34	21.78	22.40
	5	32.30	31.80	28.02	27.32	28.10
	6	38.98	38.38	33.78	32.92	33.88
63 Eu	1	6.16	6.06	5.36	5.22	5.38
	2	12.34	12.16	10.72	10.46	10.76
	3	18.56	18.28	16.12	15.72	16.18
	4	24.84	24.44	21.56	21.00	21.62
	5	31.20	30.70	27.04	26.34	27.12
	6	37.64	37.04	32.58	31.74	32.68

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TABLE 2. - K spectral lines of elements atomic numbers 21-63 LiF analyzer (Degrees 2θ)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
21 Sc	1			87.48		
22 Ti	1	86.42	86.28	77.42		
23 V	1	77.16	77.04	69.26		
24 Cr	1	69.58	69.44	62.48		
25 Mn	1	63.18	63.04	56.74		
26 Fe	1	57.70	57.58	51.82		
27 Co	1	52.98	52.84	47.56		
28 Ni	1	48.84	48.72	43.82	43.46	
29 Cu	1	45.18	45.06	40.52	40.18	
	2			87.68	86.80	
30 Zn	1	41.94	41.84	37.60	37.24	
	2			80.24	79.38	
31 Ga	1	39.06	38.94	34.96	34.62	
	2	83.90	83.62	73.86	73.04	
32 Ge	1	36.46	36.34	32.62	32.26	
	2	77.48	77.18	68.34	67.50	
33 As	1	34.14	34.02	30.50	30.14	
	2	71.88	71.60	63.46	62.64	
34 Se	1	32.02	31.90	28.58	28.22	
	2	66.96	66.68	59.16	58.36	
35 Br	1	30.10	29.98	26.84	26.48	
	2	62.58	62.30	55.30	54.50	
	3			88.24	86.76	
37 Rb	1	26.74	26.62	23.78	23.44	23.80
	2	55.10	54.84	48.70	47.92	48.72
	3	87.86	87.36	76.40	75.08	76.46
38 Sr	1	25.28	25.14	22.46	22.10	22.48
	2	51.90	51.62	45.84	45.10	45.88
	3	82.04	81.56	71.50	70.24	71.56
39 Y	1	23.92	23.80	21.24	20.88	21.26
	2	48.96	48.70	43.24	42.50	43.28
	3	76.88	76.42	67.12	65.88	67.16
40 Zr	1	22.68	22.54	20.10	19.76	20.12
	2	46.30	46.04	40.86	40.14	40.90
	3	72.26	71.82	63.16	61.98	63.20
	4			88.56	86.70	88.64
41 Nb	1	21.52	21.40	19.06	18.74	19.08
	2	43.84	43.58	38.68	37.98	38.72
	3	68.12	67.68	59.58	58.44	59.64
	4			82.96	81.22	83.06

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TABLE 2. - K spectral lines of elements atomic numbers 21-63 LiF analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
42 Mo	1	20.46	20.32	18.10	17.76	18.12
	2	41.62	41.32	36.68	36.00	36.70
	3	64.42	63.92	56.32	55.22	56.36
	4		89.78	77.98	76.32	78.04
43 Tc	1	19.46	19.32	17.20	16.90	
	2	39.50	39.22	34.82	34.16	
	3	60.90	60.46	53.34	52.28	
	4	85.02	84.34	73.52	71.96	
44 Ru	1	18.54	18.40	16.38	16.06	16.40
	2	37.56	37.32	33.10	32.44	33.12
	3	57.78	57.36	50.58	49.56	50.64
	4	80.20	79.56	69.46	67.94	69.54
	5				88.62	
45 Rh	1	17.68	17.56	15.60	15.30	15.62
	2	35.78	35.54	31.50	30.88	31.54
	3	54.88	54.48	48.06	47.06	48.12
	4	75.84	75.22	65.76	64.32	65.84
	5			85.48	83.42	85.58
46 Pd	1	16.88	16.74	14.88	14.58	14.90
	2	34.12	33.88	30.02	29.40	30.06
	3	52.22	51.82	45.72	44.76	45.76
	4	71.88	71.26	62.38	61.02	62.46
	5			80.70	78.78	80.80
47 Ag	1	16.12	16.00	14.20	13.92	14.22
	2	32.58	32.32	28.64	28.04	28.68
	3	49.76	49.34	43.54	42.62	43.60
	4	68.24	67.64	59.28	57.96	59.36
	5	89.06	88.18	76.36	74.56	76.50
48 Cd	1	15.42	15.30	13.58	13.28	13.60
	2	31.14	30.88	27.34	26.76	27.38
	3	47.48	47.06	41.52	40.62	41.58
	4	64.92	64.32	56.42	55.14	56.50
	5	84.28	83.44	72.42	70.68	72.56
	6				87.92	
49 In	1	14.76	14.64	12.98	12.72	13.00
	2	29.78	29.52	26.14	25.58	26.18
	3	45.34	44.94	39.66	38.80	39.70
	4	61.86	61.26	53.78	52.56	53.86
	5	79.94	79.12	68.84	67.22	68.96
	6			85.44	83.24	85.58
50 Sn	1	14.14	14.02	12.42	12.16	12.44
	2	28.52	28.26	25.00	24.46	25.04
	3	43.36	42.96	37.90	37.06	37.96
	4	59.02	58.44	51.32	50.14	51.40
	5	76.00	75.20	65.54	63.96	65.64
	6			81.02	78.92	81.16

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TABLE 2. - K spectral lines of elements atomic numbers 21-63 LiF analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
51 Sb	1	13.56	13.44	11.90	11.64	11.90
	2	27.32	27.06	23.96	23.42	23.96
	3	41.50	41.10	36.28	35.44	36.28
	4	56.38	55.80	49.04	47.90	49.04
	5	72.40	71.60	62.50	60.98	62.50
	6		89.16	77.00	75.00	77.00
52 Te	1	13.02	12.90	11.42	11.16	11.42
	2	26.22	25.94	22.96	22.44	22.96
	3	39.78	39.36	34.74	33.94	34.74
	4	53.94	53.36	46.92	45.82	46.92
	5	69.08	68.30	59.68	58.24	59.68
	6	85.74	84.68	73.34	71.44	73.34
53 I	1	12.50	12.38	10.96	10.72	10.98
	2	25.16	24.90	22.02	21.54	22.06
	3	38.14	37.74	33.30	32.54	33.36
	4	51.66	51.10	44.92	43.88	45.02
	5	66.00	65.24	57.04	55.68	57.18
	6	81.62	80.62	69.92	68.18	70.08
55 Cs	1	11.56	11.44	10.12	9.88	10.14
	2	23.24	22.98	20.30	19.82	20.36
	3	35.18	34.78	30.66	29.92	30.74
	4	47.52	46.96	41.28	40.26	41.38
	5	60.48	59.74	52.30	50.96	52.42
	6	74.36	73.40	63.84	62.16	64.02
56 Ba	1	11.12	11.02	9.72	9.50	9.74
	2	22.36	22.10	19.52	19.06	19.56
	3	33.82	33.40	29.46	28.76	29.52
	4	45.62	45.06	39.64	38.66	39.72
	5	57.98	57.24	50.16	48.90	50.26
	6	71.12	70.16	61.14	59.56	61.28
57 La	1	10.72	10.58	9.36	9.14	9.38
	2	21.52	21.26	18.78	18.34	18.82
	3	32.52	32.12	28.34	27.66	28.40
	4	43.86	43.30	38.10	37.16	38.18
	5	55.64	54.92	48.16	46.94	48.26
	6	68.12	67.18	58.62	57.10	58.76
58 Ce	1	10.32	10.20	9.02	8.80	9.04
	2	20.74	20.46	18.08	17.64	18.12
	3	31.32	30.90	27.26	26.60	27.32
	4	42.18	41.62	36.62	35.72	36.72
	5	53.48	52.74	46.26	45.10	46.36
	6	65.34	64.40	56.24	54.78	56.38
59 Pr	1	9.96	9.82	8.68	8.48	8.70
	2	19.98	19.72	17.42	16.98	17.46
	3	30.16	29.76	26.24	25.60	26.30
	4	40.60	40.04	35.24	34.36	35.32
	5	51.42	50.68	44.48	43.34	44.58
	6	62.72	61.80	54.02	52.60	54.14

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TABLE 2. - K spectral lines of elements atomic numbers 21-63 LiF analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
60 Nd	1	9.60	9.46	8.36	8.16	8.38
	2	19.28	19.00	16.78	16.38	16.82
	3	29.08	28.68	25.28	24.68	25.34
	4	39.12	38.56	33.94	33.10	34.02
	5	49.48	48.76	42.78	41.72	42.90
	6	60.28	59.38	51.92	50.60	52.06
61 Pm	1	9.26	9.16	8.04		8.04
	2	18.60	18.36	16.14		16.14
	3	28.04	27.70	24.30		24.30
	4	37.72	37.22	32.60		32.60
	5	47.66	47.02	41.08		41.08
	6	58.00	57.20	49.80		49.80
62 Sm	1	8.94	8.82	7.80	7.60	7.82
	2	17.96	17.68	15.62	15.22	15.66
	3	27.08	26.66	23.52	22.92	23.58
	4	36.38	35.80	31.54	30.74	31.62
	5	45.92	45.20	39.70	38.68	39.82
	6	55.82	54.92	48.10	46.84	48.24
63 Eu	1	8.66	8.52	7.52	7.34	7.54
	2	17.36	17.08	15.08	14.70	15.12
	3	26.16	25.74	22.68	22.12	22.76
	4	35.12	34.56	30.42	29.62	30.50
	5	44.32	43.58	38.28	37.28	38.40
	6	53.82	52.92	46.34	45.10	46.48

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TABLE 3. - K spectral lines of elements atomic numbers 22-63 Quartz analyzer (Degrees 2θ)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
22 Ti	1			87.26		
23 V	1	87.18	87.02	77.84		
24 Cr	1	78.22	78.06	69.98		
25 Mn	1	70.78	70.62	63.38		
26 Fe	1	64.48	64.34	57.78		
27 Co	1	59.08	58.94	52.94		
28 Ni	1	54.40	54.26	48.74	48.34	
29 Cu	1	50.26	50.14	45.02	44.64	
30 Zn	1	46.62	46.50	41.74	41.36	
	2				89.84	
31 Ga	1	43.38	43.24	38.80	38.42	
	2			83.24	82.30	
32 Ge	1	40.48	40.34	36.18	35.78	
	2	87.56	87.20	76.78	75.80	
33 As	1	37.88	37.74	33.80	33.40	
	2	80.94	80.60	71.14	70.18	
34 Se	1	35.52	35.38	31.68	31.28	
	2	75.16	74.84	66.16	65.24	
35 Br	1	33.36	33.22	29.72	29.32	
	2	70.08	69.76	61.74	60.82	
37 Rb	1	29.64	29.50	26.34	25.94	26.38
	2	61.52	61.20	54.24	53.38	54.28
	3			86.28	84.70	86.34
38 Sr	1	28.00	27.86	24.86	24.48	24.90
	2	57.86	57.56	51.02	50.18	51.06
	3			80.48	79.00	80.54
39 Y	1	26.48	26.34	23.50	23.12	23.54
	2	54.54	54.24	48.08	47.26	48.12
	3	86.84	86.28	75.34	73.92	75.42
40 Zr	1	25.10	24.96	22.26	21.88	22.26
	2	51.52	51.22	45.42	44.60	45.44
	3	81.38	80.84	70.76	69.40	70.82
41 Cb	1	23.82	23.68	21.10	20.72	21.12
	2	48.76	48.48	42.96	42.18	43.00
	3	76.50	76.00	66.64	65.34	66.70
42 Mo	1	22.66	22.50	20.04	19.68	20.04
	2	46.26	45.94	40.70	39.94	40.74
	3	72.22	71.64	62.90	61.64	62.94
	4			88.16	86.18	88.24
43 Tc	1	21.54	21.40	19.04	18.70	
	2	43.86	43.56	38.64	37.90	
	3	68.16	67.66	59.50	58.30	
	4			82.84	81.00	

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TABLE 3. - K spectral lines of elements atomic numbers 22-63 Quartz analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
44 Ru	1	20.52	20.36	18.12	17.78	18.14
	2	41.72	41.44	36.72	35.98	36.74
	3	64.56	64.08	56.38	55.22	56.44
	4			78.08	76.32	78.18
45 Rh	1	19.56	19.42	17.26	16.92	17.28
	2	39.72	39.42	34.92	34.24	34.96
	3	61.28	60.80	53.52	52.38	53.58
	4	85.60	84.86	73.76	72.12	73.88
46 Pd	1	18.68	18.54	16.46	16.14	16.48
	2	37.86	37.58	33.28	32.60	33.30
	3	58.24	57.78	50.88	49.80	50.92
	4	80.90	80.20	69.86	68.30	69.96
	5				89.12	
47 Ag	1	17.84	17.70	15.72	15.40	15.74
	2	36.14	35.84	31.74	31.08	31.78
	3	55.44	54.98	48.42	47.38	48.48
	4	76.66	75.96	66.30	64.80	66.40
	5			86.22	84.10	86.38
48 Cd	1	17.06	16.92	15.00	14.70	15.04
	2	34.52	34.24	30.30	29.64	30.34
	3	52.84	52.38	46.14	45.12	46.22
	4	72.80	72.12	63.02	61.56	63.10
	5			81.56	79.52	81.72
49 In	1	16.34	16.18	14.36	14.06	14.38
	2	33.02	32.72	28.96	28.34	29.00
	3	50.46	49.98	44.06	43.08	44.12
	4	69.24	68.58	60.00	58.62	60.10
	5		89.54	77.36	75.46	77.48
50 Sn	1	15.64	15.50	13.76	13.46	13.76
	2	31.60	31.32	27.70	27.10	27.74
	3	48.22	47.76	42.10	41.14	42.16
	4	66.00	65.32	57.22	55.86	57.30
	5	85.80	84.84	73.52	71.68	73.64
	6				89.28	
51 Sb	1	15.02	14.86	13.18	12.88	13.18
	2	30.28	29.98	26.52	25.94	26.52
	3	46.12	45.66	40.26	39.34	40.26
	4	62.98	62.32	54.64	53.32	54.64
	5	81.52	80.60	70.00	68.24	70.00
	6			87.00	84.62	87.00
52 Te	1	14.40	14.26	12.64	12.36	12.64
	2	29.04	28.74	25.44	24.86	25.44
	3	44.18	43.72	38.56	37.66	38.56
	4	60.18	59.54	52.24	50.98	52.24
	5	77.64	76.72	66.76	65.10	66.76
	6			82.64	80.42	82.64

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TABLE 3. - K spectral lines of elements atomic numbers 22-63 Quartz analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
53 I	1	13.84	13.70	12.12	11.86	12.14
	2	27.88	27.58	24.38	23.84	24.44
	3	42.36	41.90	36.92	36.10	37.02
	4	57.60	56.96	49.96	48.80	50.08
	5	74.06	73.18	63.72	62.18	63.88
	6			78.62	76.58	78.82
55 Cs	1	12.80	12.64	11.18	10.92	11.22
	2	25.74	25.44	22.48	21.94	22.52
	3	39.04	38.58	34.00	33.16	34.08
	4	52.90	52.28	45.88	44.74	45.98
	5	67.66	66.82	58.32	56.82	58.46
	6	83.86	82.72	71.56	69.62	71.74
56 Ba	1	12.30	12.16	10.76	10.50	10.78
	2	24.76	24.46	21.60	21.10	21.66
	3	37.50	37.06	32.66	31.88	32.74
	4	50.76	50.14	44.04	42.94	44.14
	5	64.80	63.96	55.90	54.46	56.02
	6	80.02	78.90	68.44	66.60	68.60
57 La	1	11.84	11.70	10.34	10.10	10.36
	2	23.82	23.54	20.78	20.30	20.84
	3	36.08	35.62	31.40	30.64	31.46
	4	48.76	48.14	42.30	41.26	42.40
	5	62.14	61.30	53.62	52.26	53.74
	6	76.52	75.44	65.52	63.80	65.68
58 Ce	1	11.42	11.28	9.96	9.72	9.98
	2	22.94	22.66	20.00	19.52	20.06
	3	34.72	34.26	30.20	29.46	30.28
	4	46.88	46.26	40.66	39.64	40.76
	5	59.64	58.82	51.48	50.16	51.60
	6	73.28	72.20	62.82	61.16	62.96
59 Pr	1	11.00	10.86	9.60	9.36	9.62
	2	22.12	21.82	19.26	18.80	19.32
	3	33.44	33.00	29.08	28.36	29.14
	4	45.12	44.50	39.10	38.12	39.20
	5	57.32	56.48	49.46	48.20	49.58
	6	70.26	69.20	60.28	58.68	60.42
60 Nd	1	10.62	10.48	9.26	9.04	9.28
	2	21.34	21.04	18.56	18.12	18.62
	3	32.24	31.78	28.00	27.32	28.08
	4	43.44	42.82	37.64	36.72	37.74
	5	55.12	54.30	47.56	46.38	47.70
	6	67.44	66.40	57.88	56.38	58.04
61 Pm	1	10.26	10.12	8.90		8.90
	2	20.58	20.32	17.86		17.86
	3	31.08	30.68	26.92		26.92
	4	41.88	41.32	36.16		36.16
	5	53.06	52.34	45.66		45.66
	6	64.82	63.90	55.48		55.48

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TABLE 3. - K spectral lines of elements atomic numbers 22-63 Quartz analyzer (Degrees 2θ) (Con.)

Element	n	$K\alpha_2$	$K\alpha_1$	$K\beta_1$	$K\beta_2$	$K\beta_3$
62 Sm	1	9.90	9.76	8.62	8.40	8.64
	2	19.86	19.58	17.28	16.84	17.32
	3	30.00	29.54	26.04	25.38	26.12
	4	40.36	39.74	34.96	34.06	35.06
	5	51.10	50.28	44.10	42.96	44.24
	6	62.34	61.30	53.56	52.14	53.72
63 Eu	1	9.58	9.42	8.32	8.10	8.34
	2	19.20	18.90	16.68	16.26	16.72
	3	28.98	28.52	25.12	24.48	25.20
	4	38.98	38.34	33.72	32.84	33.82
	5	49.30	48.48	42.50	41.38	42.64
	6	60.06	59.02	51.56	50.18	51.74

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TABLE 4. - L spectral lines of elements atomic numbers 46-92 NaCl analyzer

Element	n	L_l	L_η	La_2	La_1	$L\beta_1$	$L\beta_2$	$L\beta_3$	$L\beta_4$	$L\beta_6$	L_{γ_1}
46 Pd	1						87.76				82.66
47 Ag	1					88.48	82.04	85.62	86.64	84.90	77.30
48 Cd	1			89.34	89.08	83.02	77.08	80.50	81.52	79.72	72.50
49 In	1			84.18	83.94	78.16	72.58	75.92	76.88	75.04	68.20
50 Sn	1		84.44	79.56	79.32	73.76	68.52	71.78	72.72	70.86	64.30
51 Sb	1	87.16	79.52	75.38	75.14	69.76	64.82	67.96	68.92	67.04	60.74
52 Te	1	82.48		71.56	71.34	66.12	61.46	64.46	65.38	63.56	57.50
53 I	1	78.20		68.10	67.86	62.76	58.40	61.28	62.18	60.38	54.52
55 Cs	1	70.78	64.02	61.92	61.70	56.82	52.90	55.56	56.42	54.74	49.20
56 Ba	1	67.54	61.02	59.18	58.96	54.16	50.46	53.00	53.88	52.24	46.84
57 La	1	64.42	58.12	56.62	56.40	51.68	48.20	50.60	51.48	49.90	44.64
58 Ce	1	61.70	55.38	54.22	54.02	49.38	46.12	48.38	49.24	47.72	42.60
59 Pr	1	59.16	52.90	52.02	51.78	47.22	44.14	46.30	47.12	45.70	40.70
	2										88.12
60 Nd	1	56.66	50.58	49.94	49.70	45.18	42.32	44.30	45.18	43.80	38.90
	2										83.50
62 Sm	1	52.22	46.32	46.14	45.92	41.50	39.00	40.72	41.56	40.38	35.66
	2									87.30	75.52
63 Eu	1	50.26		44.42	44.18	39.82	37.48	39.08	39.94	38.82	34.18
	2					85.84	79.96	83.98	86.16	83.32	72.02
64 Gd	1	48.40	42.62	42.78	42.54	38.22	36.06	37.54	38.36	37.38	32.78
	2					81.80	76.50	80.12	82.16	79.70	68.74
65 Tb	1	46.66		41.24	41.02	36.72	34.72	36.08	36.90	35.96	31.48
	2			89.56	89.00	78.10	73.26	76.52	78.56	76.26	65.70
66 Dy	1	45.02	39.30	39.80	39.56	35.30	33.46	34.68	35.52	34.68	30.28
	2		84.50	85.80	85.20	74.66	70.28	73.20	75.18	73.20	62.98
67 Ho	1	43.42	37.78	38.44	38.18	33.96	32.26	33.38	34.20	33.44	29.10
	2		80.70	82.32	81.72	71.46	67.52	70.10	72.06	70.24	60.34
68 Er	1	41.96	36.34	37.12	36.88	32.68	31.14	32.14	32.96	32.26	28.02
	2		77.16	79.08	78.50	68.48	64.94	67.24	69.12	67.52	57.92
69 Tm	1	40.56	35.00	35.88	35.66	31.48	30.08	30.96	31.78	31.16	26.98
	2	87.78	73.94	76.08	75.50	65.72	62.52	64.54	66.42	64.98	55.62
	3										88.82
70 Yb	1	39.24	33.70	34.72	34.48	30.34	29.08	29.84	30.66	30.12	25.98
	2	84.38	70.84	73.26	72.70	63.10	60.28	62.00	63.86	62.64	53.42
	3										84.78
71 Lu	1	37.98	32.48	33.60	33.36	29.24	28.12	28.76	29.58	29.12	25.04
	2	81.22	68.02	70.60	70.08	60.64	58.14	59.58	61.42	60.34	51.40
	3										81.16
72 Hf	1	36.82	31.34	32.54	32.32	28.20	27.20	27.76	28.58	28.20	24.14
	2	78.34	65.38	68.16	67.64	58.32	56.12	57.32	59.18	58.32	49.42
	3						89.76				77.68

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TABLE 4. - L spectral lines of elements atomic numbers 46-92 NaCl analyzer (Con.)

Element	n	L_ℓ	L_η	La_2	La_1	$L\beta_1$	$L\beta_2$	$L\beta_3$	$L\beta_4$	$L\beta_6$	$L\gamma_1$
73 Ta	1	35.70	30.24	31.54	31.30	27.22	26.34	26.80	27.60	27.30	23.28
	2	75.62	62.88	65.86	65.32	56.14	54.20	55.22	57.02	56.34	47.60
	3					89.80	86.20	88.08			74.50
74 W	1	34.62	29.20	30.58	30.36	26.28	25.50	25.88	26.68	26.44	22.48
	2	73.06	60.52	63.68	63.14	54.08	52.38	53.20	54.98	54.44	45.86
	3					85.98	82.92	84.38	87.62	86.64	71.52
75 Re	1	33.62	28.20	29.68	29.44	25.38	24.70	25.00	25.80	25.62	21.68
	2	70.66	58.30	61.60	61.08	52.12	50.66	51.28	53.04	52.66	44.20
	3					82.42	79.86	80.94	84.08	83.40	68.72
76 Os	1			28.78	28.56	24.52	23.98				20.94
	2			59.62	59.14	50.26	49.08				42.64
	3					79.12	77.08				66.08
77 Ir	1		26.32	27.96	27.72	23.70	23.22	23.34	24.14	24.12	20.24
	2		54.20	57.80	57.26	48.48	47.48	47.72	49.46	49.38	41.14
	3		86.20			76.04	74.30	74.72	77.72	77.60	63.62
	4										89.30
78 Pt	1	30.84	25.46	27.16	26.92	22.90	22.54	22.58	23.36	23.40	19.56
	2	64.24	52.30	56.02	55.50	46.80	46.02	46.10	47.80	47.84	39.72
	3		82.78	89.56	88.62	73.12	71.78	71.92	74.84	74.92	61.28
	4										85.60
79 Au	1	30.00	24.62	26.40	26.16	22.16	21.88	21.84	22.64	22.72	18.92
	2	62.36	50.50	54.34	53.82	45.20	44.60	44.50	46.20	46.40	38.36
	3		79.56	86.46	85.54	70.40	69.40	69.22	72.12	72.46	59.06
	4										82.16
80 Hg	1	29.20	23.82	25.66	25.42	21.44	21.26	21.10	21.90	22.06	18.30
	2	60.54	48.76	52.72	52.24	43.66	43.28	42.96	44.66	45.00	37.08
	3		76.52	83.52	82.64	67.82	67.16	66.64	69.50	70.06	56.96
	4										78.96
81 Tl	1	28.42	23.08	24.96	24.72	20.74	20.64	20.44	21.24	21.46	17.70
	2	58.82	47.16	51.22	50.70	42.20	42.00	41.56	43.24	43.70	35.84
	3		73.72	80.82	79.92	65.38	65.04	64.32	67.12	67.88	54.96
	4										75.94
82 Pb	1	27.70	22.34	24.28	24.04	20.08	20.08	19.80	20.58	20.86	17.12
	2	57.22	45.58	49.76	49.24	40.80	40.80	40.22	41.88	42.46	34.64
	3		71.04	78.28	77.36	63.04	63.04	62.08	64.82	65.80	53.06
	4					88.40	88.40	86.86			73.12
83 Bi	1	27.00	21.64	23.64	23.40	19.44	19.50	19.16	19.96	20.30	16.58
	2	55.66	44.10	48.38	47.86	39.46	39.60	38.88	40.54	41.26	33.52
	3	88.90	68.54	75.84	74.96	60.84	61.08	59.92	62.62	63.80	51.24
	4					84.94	85.30	83.48	87.74	89.58	70.44

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TABLE 4. - L spectral lines of elements atomic numbers 46-92 NaCl analyzer (Con.)

Element	n	L_ℓ	L_η	La_2	La_1	$L\beta_1$	$L\beta_2$	$L\beta_3$	$L\beta_4$	$L\beta_6$	L_γ
90 Th	1	22.80	17.44	19.76	19.52	15.60	16.18	15.38	16.18	16.88	13.30
	2	46.58	35.28	40.14	39.62	31.48	32.68	31.06	32.68	34.16	26.78
	3	72.76	54.08	61.98	61.14	48.04	49.94	47.34	49.94	52.28	40.66
	4		74.62	86.70	85.38	65.74	68.50	64.74	68.50	71.94	55.18
	5					85.44	89.42	84.00	89.42		70.74
	6										88.02
91 Pa	1	22.30	16.92	19.28	19.04	15.12	15.78	14.92	15.70	16.48	12.90
	2	45.52	34.22	39.14	38.64	30.52	31.86	30.10	31.70	33.30	25.98
	3	70.94	52.38	60.34	59.50	46.52	48.60	48.86	48.36	50.90	39.42
	4		72.08	84.14	82.86	63.52	66.56	62.58	66.20	69.92	53.44
	5					82.30	86.62	80.96	86.10		68.38
	6										84.80
92 U	1	21.80	16.42	18.82	18.58	14.68	15.38	14.48	15.24	16.08	12.52
	2	44.48	33.18	38.20	37.68	29.58	31.04	29.18	30.76	32.48	25.18
	3	69.18	50.72	58.78	57.94	45.04	47.34	44.40	46.88	49.60	38.18
	4		69.66	81.74	80.46	61.42	64.72	60.50	64.08	68.00	51.72
	5					79.34	83.98	78.04	83.08	88.70	66.06
	6										81.70

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TABLE 5. - L spectral lines of elements atomic numbers 52-92 LiF analyzer

Element	n	L_ℓ	L_η	La_2	La_1	$L\beta_1$	$L\beta_2$	$L\beta_3$	$L\beta_4$	$L\beta_6$	L_{γ_1}
52 Te	1										84.86
53 I	1						86.38			89.74	79.96
55 Cs	1					83.74	77.32	81.66	83.08	80.32	71.44
56 Ba	1			87.68	87.32	79.38	73.46	77.50	78.92	76.26	67.76
57 La	1		85.92	83.40	83.06	75.40	69.88	73.68	75.06	72.56	64.38
58 Ce	1		81.34	79.50	79.16	71.74	66.66	70.16	71.50	69.16	61.26
59 Pr	1	87.66	77.34	75.92	75.56	68.36	63.62	66.94	68.22	66.02	58.38
60 Nd	1	83.46	73.64	72.62	72.26	65.22	60.84	63.88	65.22	63.10	55.68
62 Sm	1	76.26	67.00	66.70	66.34	59.60	55.82	58.42	59.68	57.90	50.88
63 Eu	1	73.14		64.04	63.68	57.06	53.58	55.98	57.26	55.58	48.70
64 Gd	1	70.22	61.30	61.54	61.18	54.68	51.46	53.66	54.90	53.42	46.66
65 Tb	1	67.50		59.22	58.86	52.44	49.48	51.48	52.72	51.32	44.74
66Dy	1	64.94	56.28	57.04	56.68	50.36	47.62	49.44	50.68	49.44	42.98
67 Ho	1	62.52	54.02	54.98	54.64	48.36	45.88	47.50	48.74	47.60	41.28
	2										89.66
68 Er	1	60.30	51.88	53.04	52.70	46.50	44.24	45.70	46.90	45.88	39.70
	2										85.56
69 Tm	1	58.20	49.90	51.22	50.86	44.74	42.68	43.98	45.18	44.26	38.20
	2										81.76
70 Yb	1	56.22	47.96	49.48	49.14	43.06	41.24	42.36	43.54	42.76	36.76
	2						89.56				78.18
71 Lu	1	54.34	46.20	47.82	47.50	41.48	39.86	40.80	41.98	41.28	35.42
	2						85.94	88.38		89.68	74.94
72 Hf	1	52.60	44.52	46.30	45.96	39.96	38.52	39.32	40.52	39.96	34.10
	2					86.24	82.58	84.58	87.66	86.24	71.82
73 Ta	1	50.94	42.92	44.84	44.50	38.54	37.26	37.94	39.12	38.68	32.88
	2					82.62	79.44	81.10	84.06	82.94	68.96
74 W	1	49.36	41.40	43.44	43.08	37.18	36.06	36.60	37.78	37.42	31.72
	2		89.98			79.24	76.50	77.82	80.70	79.82	66.26
75 Re	1	47.86	39.96	42.10	41.76	35.88	34.94	35.34	36.50	36.26	30.60
	2		86.20			76.08	73.78	74.74	77.56	76.96	63.70
76 Os	1			40.80	40.50	34.66	33.88				29.54
	2			88.42	87.62	73.12	71.28				61.32
77 Ir	1		37.26	39.62	39.28	33.48	32.80	32.98	34.12	34.08	28.54
	2		79.42	85.36	84.48	70.34	68.78	69.16	71.86	71.74	59.06
78 Pt	1	43.80	36.02	38.46	38.12	32.34	31.82	31.88	33.02	33.04	27.56
	2		76.38	82.42	81.56	67.72	66.50	66.62	69.26	69.34	56.92
79 Au	1	42.58	34.82	37.36	37.02	31.28	30.88	30.80	31.96	32.08	26.66
	2		73.50	79.68	78.84	65.24	64.34	64.18	66.80	67.10	54.90
	3										87.48

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TABLE 5. - L spectral lines of elements atomic numbers 52-92 LiF analyzer (Con.)

Element	n	L_l	L_η	$L\alpha_2$	$L\alpha_1$	$L\beta_1$	$L\beta_2$	$L\beta_3$	$L\beta_4$	$L\beta_6$	L_{γ_1}
80 Hg	1	41.42	33.66	36.30	35.96	30.24	29.98	29.76	30.92	31.14	25.76
	2	90.00	70.76	77.06	76.26	62.90	62.30	61.82	64.42	64.94	52.98
	3										83.98
81 Tl	1	40.30	32.58	35.30	34.96	29.26	29.12	28.82	29.96	30.28	24.92
	2	87.08	68.26	74.64	73.84	60.66	60.34	59.70	62.26	62.96	51.14
	3										80.68
82 Pb	1	39.24	31.54	34.34	33.98	28.30	28.30	27.90	29.04	29.42	24.12
	2	84.40	65.82	72.36	71.54	58.54	58.54	57.66	60.18	61.06	49.38
	3										77.60
83 Bi	1	38.24	30.54	33.40	33.06	27.40	27.50	27.00	28.14	28.62	23.34
	2	81.82	63.56	70.16	69.36	56.54	56.74	55.68	58.18	59.24	47.72
								88.92			74.70
90 Th	1	32.20	24.54	27.86	27.52	21.94	22.76	21.64	22.76	23.78	18.70
	2	67.38	50.32	57.56	56.80	44.74	46.52	44.10	46.52	48.66	37.92
	3		79.24			69.64	72.62	68.56	72.62	76.34	58.32
	4										81.04
91 Pa	1	31.48	23.82	27.18	26.84	21.28	22.20	20.98	22.08	23.18	18.14
	2	65.72	48.74	56.06	55.30	43.34	45.28	42.72	45.04	47.40	36.76
	3		76.50	89.66	88.24	67.26	70.54	66.24	70.14	74.14	56.46
	4										78.20
92 U	1	30.78	23.10	26.54	26.18	20.64	21.64	20.36	21.44	22.62	17.60
	2	64.14	47.22	54.64	53.88	41.98	44.10	41.38	43.68	46.18	35.62
	3		73.86	87.02	85.60	65.00	68.54	64.02	67.86	72.08	54.62
	4							89.92			75.44

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TABLE 6. - L spectral lines of elements atomic numbers 55-92 Quartz analyzer

Element	n	L_l	L_η	La_2	La_1	$L\beta_1$	$L\beta_2$	$L\beta_3$	$L\beta_4$	$L\beta_6$	$L\gamma_1$
55 Cs	1						87.38				80.42
56 Ba	1					89.84	82.78	87.58	89.30	86.10	76.12
57 La	1					85.08	78.60	83.04	84.68	81.72	72.16
58 Ce	1			89.98	89.56	80.76	74.80	78.92	80.48	77.74	68.58
59 Pr	1		87.40	85.70	85.26	76.80	71.30	75.14	76.64	74.08	65.26
60 Nd	1		82.98	81.78	81.36	73.14	68.08	71.58	73.14	70.70	62.18
62 Sm	1	86.10	75.20	74.86	74.44	66.66	62.34	65.30	66.76	64.72	56.70
63 Eu	1	82.40		71.78	71.36	63.76	59.78	62.50	63.98	62.06	54.24
64 Gd	1	78.96	68.62	68.90	68.48	61.02	57.38	59.88	61.28	59.60	51.92
65 Tb	1	75.80		66.22	65.82	58.48	55.12	57.40	58.80	57.22	49.76
66 Dy	1	72.82	62.86	63.74	63.32	56.10	53.02	55.08	56.48	55.08	47.78
67 Ho	1	70.02	60.28	61.38	60.98	53.86	51.06	52.90	54.28	53.00	45.88
68 Er	1	67.46	57.84	59.16	58.76	51.74	49.20	50.84	52.20	51.06	44.10
69 Tm	1	65.06	55.60	57.08	56.68	49.76	47.46	48.92	50.26	49.24	42.42
70 Yb	1	62.78	53.42	55.12	54.72	47.88	45.82	47.08	48.42	47.54	40.80
	2										88.40
71 Lu	1	60.64	51.40	53.26	52.88	46.10	44.26	45.32	46.66	45.88	39.30
	2										84.54
72 Hf	1	58.66	49.52	51.52	51.14	44.40	42.78	43.68	45.02	44.40	37.84
	2										80.84
73 Ta	1	56.78	47.72	49.86	49.48	42.80	41.38	42.12	43.44	42.96	36.48
	2						89.90				77.50
74 W	1	54.98	46.00	48.30	47.92	41.28	40.04	40.64	41.94	41.54	35.18
	2					89.66	86.40	87.96			74.34
75 Re	1	53.30	44.38	46.80	46.42	39.84	38.76	39.22	40.52	40.24	33.92
	2					85.55	83.16	84.30	87.64	86.94	71.40
76 Os	1			45.34	45.00	38.44	37.58				32.74
	2					82.38	80.22				68.64
77 Ir	1		41.38	44.02	43.64	37.14	36.38	36.58	37.86	37.80	31.62
	2		89.90			79.10	77.28	77.54	80.90	80.76	66.06
78 Pt	1	48.70	39.98	42.72	42.34	35.88	35.28	35.36	36.62	36.66	30.56
	2		86.26			76.04	74.62	74.78	77.84	77.94	63.60
79 Au	1	47.34	38.64	41.48	41.10	34.68	34.24	34.16	35.44	35.58	29.52
	2		82.84		89.18	73.16	72.12	71.94	74.98	75.34	61.28
80 Hg	1	46.02	37.34	40.28	39.92	33.52	33.24	33.00	34.28	34.52	28.54
	2		79.62	87.04	86.10	70.44	69.78	69.22	72.22	72.82	59.08
81 Tl	1	44.78	36.14	39.16	38.80	32.42	32.26	31.94	33.22	33.56	27.60
	2		76.68	84.18	83.24	67.88	67.52	66.78	69.72	70.54	57.00
82 Pb	1	43.60	34.96	38.10	37.70	31.36	31.36	30.92	32.18	32.62	26.70
	2		73.84	81.48	80.52	65.46	65.46	64.44	67.32	68.34	55.02
	3										87.70

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TABLE 6. - L spectral lines of elements atomic numbers 55-92 Quartz analyzer (Con.)

Element	n	L_l	L_η	$L\alpha_2$	$L\alpha_1$	$L\beta_1$	$L\beta_2$	$L\beta_3$	$L\beta_4$	$L\beta_6$	$L\gamma_1$
83 Bi	1	42.44	33.86	37.06	36.68	30.36	30.46	29.92	31.18	31.70	25.84
	2		71.22	78.92	77.98	63.14	63.40	62.16	65.02	66.24	53.12
	3										84.26
90 Th	1	35.72	27.18	30.86	30.48	24.30	25.20	23.96	25.20	26.34	20.70
	2	75.66	56.08	64.32	63.44	49.78	51.76	49.06	51.76	54.20	42.10
	3		89.66			78.30	81.80	77.02	81.80	86.18	65.20
91 Pa	1	34.92	26.38	30.12	29.74	23.56	24.58	23.24	24.46	25.68	20.08
	2	73.74	54.30	62.60	61.74	48.20	50.36	47.50	50.10	52.76	40.80
	3		86.38			75.52	79.34	74.34	78.88	83.60	63.42
	4										88.42
92 U	1	34.14	25.58	29.40	29.00	22.84	23.96	22.52	23.74	25.04	19.48
	2	71.90	52.56	60.98	60.10	46.66	49.06	45.98	48.58	51.40	39.54
	3		83.24			72.90	77.02	71.74	76.20	81.16	60.98
	4										85.12

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz

	NaCl	LiF	Quartz
5.22	$EuK_{\beta_2}(1)$		
.36	$EuK_{\beta_1}(1)$		
.38	$EuK_{\beta_3}(1)$		
.42	$SmK_{\beta_2}(1)$		
.56	$SmK_{\beta_1}(1)$, $SmK_{\beta_3}(1)$		
.74	$PmK_{\beta_1}(1)$, $PmK_{\beta_3}(1)$		
.82	$NdK_{\beta_2}(1)$		
.96	$NdK_{\beta_1}(1)$		
.98	$NdK_{\beta_3}(1)$		
6.04	$PrK_{\beta_2}(1)$		
.06	$EuK_{\alpha_1}(1)$		
.16	$EuK_{\alpha_2}(1)$		
.18	$PrK_{\beta_1}(1)$		
.20	$PrK_{\beta_3}(1)$		
.26	$CeK_{\beta_2}(1)$		
.28	$SmK_{\alpha_1}(1)$		
.38	$SmK_{\alpha_2}(1)$		
.42	$CeK_{\beta_1}(1)$		
.44	$CeK_{\beta_3}(1)$		
.52	$LaK_{\beta_2}(1)$, $PmK_{\alpha_1}(1)$		
.60	$PmK_{\alpha_2}(1)$		
.66	$LaK_{\beta_1}(1)$		
.68	$LaK_{\beta_3}(1)$		
.74	$NdK_{\alpha_1}(1)$		
.76	$BaK_{\beta_2}(1)$		
.84	$NdK_{\alpha_2}(1)$		
.92	$BaK_{\beta_1}(1)$		
.94	$BaK_{\beta_3}(1)$		
7.00	$PrK_{\alpha_1}(1)$		
.02	$CsK_{\beta_2}(1)$		
.10	$PrK_{\alpha_2}(1)$		
.20	$CsK_{\beta_1}(1)$		
.22	$CsK_{\beta_3}(1)$		
.26	$CeK_{\alpha_1}(1)$		
.34		$EuK_{\beta_2}(1)$	
.36	$CeK_{\alpha_2}(1)$		
.52		$EuK_{\beta_1}(1)$	
.54	$LaK_{\alpha_1}(1)$	$EuK_{\beta_3}(1)$	
.60		$SmK_{\beta_2}(1)$	
.64	$IK_{\beta_2}(1)$, $LaK_{\alpha_2}(1)$		
.80		$SmK_{\beta_1}(1)$	
.82	$IK_{\beta_1}(1)$, $IK_{\beta_3}(1)$	$SmK_{\beta_3}(1)$	
.84	$BaK_{\alpha_1}(1)$		
.92	$BaK_{\alpha_2}(1)$		
.96	$TeK_{\beta_2}(1)$		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
8.04		$PmK_{\beta_1}(1)$, $PmK_{\beta_3}(1)$	
.10			$EuK_{\beta_2}(1)$
.14	$TeK_{\beta_1}(1)$, $TeK_{\beta_3}(1)$, $CsK_{\alpha_1}(1)$		
.16		$NdK_{\beta_2}(1)$	
.24	$CsK_{\alpha_2}(1)$		
.30	$SbK_{\beta_2}(1)$		
.32			$EuK_{\beta_1}(1)$
.34			$EuK_{\beta_3}(1)$
.36		$NdK_{\beta_1}(1)$	
.38		$NdK_{\beta_3}(1)$	
.40			$SmK_{\beta_2}(1)$
.48	$SbK_{\beta_1}(1)$, $SbK_{\beta_3}(1)$	$PrK_{\beta_2}(1)$	
.52		$EuK_{\alpha_1}(1)$	
.62			$SmK_{\beta_1}(1)$
.64			$SmK_{\beta_3}(1)$
.66	$SnK_{\beta_2}(1)$	$EuK_{\alpha_2}(1)$	
.68		$PrK_{\beta_1}(1)$	
.70		$PrK_{\beta_3}(1)$	
.80		$CeK_{\beta_2}(1)$	
.82	$IK_{\alpha_1}(1)$	$SmK_{\alpha_1}(1)$	
.86	$SnK_{\beta_3}(1)$, $SnK_{\beta_1}(1)$		
.90			$PmK_{\beta_1}(1)$, $PmK_{\beta_3}(1)$
.92	$IK_{\alpha_2}(1)$		
.94		$SmK_{\alpha_2}(1)$	
9.02		$CeK_{\beta_1}(1)$	
.04		$CeK_{\beta_3}(1)$	$NdK_{\beta_2}(1)$
.06	$InK_{\beta_2}(1)$		
.14		$LaK_{\beta_2}(1)$	
.16		$PmK_{\alpha_1}(1)$	
.18	$TeK_{\alpha_1}(1)$		
.24	$InK_{\beta_1}(1)$		
.26	$InK_{\beta_3}(1)$	$PmK_{\alpha_2}(1)$	$NdK_{\beta_1}(1)$
.28	$TeK_{\alpha_2}(1)$		$NdK_{\beta_3}(1)$
.36		$LaK_{\beta_1}(1)$	$PrK_{\beta_2}(1)$
.38		$LaK_{\beta_3}(1)$	
.42			$EuK_{\alpha_1}(1)$
.46	$CdK_{\beta_2}(1)$	$NdK_{\alpha_1}(1)$	
.50		$BaK_{\beta_2}(1)$	
.56	$SbK_{\alpha_1}(1)$		
.58			$EuK_{\alpha_2}(1)$
.60		$NdK_{\alpha_2}(1)$	$PrK_{\beta_1}(1)$
.62			$PrK_{\beta_3}(1)$
.66	$SbK_{\alpha_2}(1)$, $CdK_{\beta_1}(1)$		
.68	$CdK_{\beta_3}(1)$		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
9.72		$BaK_{\beta_1}(1)$	$CeK_{\beta_2}(1)$
.74		$BaK_{\beta_3}(1)$	
.76			$SmK_{\alpha_1}(1)$
.82		$PrK_{\alpha_1}(1)$	
.88		$CsK_{\beta_2}(1)$	
.90			$SmK_{\alpha_2}(1)$
.92	$AgK_{\beta_2}(1)$		
.96		$PrK_{\alpha_2}(1)$	$CeK_{\beta_1}(1)$
.98	$SnK_{\alpha_1}(1)$		$CeK_{\beta_3}(1)$
10.08	$SnK_{\alpha_2}(1)$		
.10	$AgK_{\beta_1}(1)$		$LaK_{\beta_2}(1)$
.12		$CsK_{\beta_1}(1)$	$PmK_{\alpha_1}(1)$
.14	$AgK_{\beta_3}(1)$	$CsK_{\beta_3}(1)$	
.20		$CeK_{\alpha_1}(1)$	
.26			$PmK_{\alpha_2}(1)$
.32		$CeK_{\alpha_2}(1)$	
.34			$LaK_{\beta_1}(1)$
.36			$LaK_{\beta_3}(1)$
.38	$PdK_{\beta_2}(1)$		
.42	$InK_{\alpha_1}(1)$		
.46	$EuK_{\beta_2}(2)$		
.48			$NdK_{\alpha_1}(1)$
.50			$BaK_{\beta_2}(1)$
.52	$InK_{\alpha_2}(1)$		
.58		$LaK_{\alpha_1}(1)$	
.60	$PdK_{\beta_1}(1)$, $PdK_{\beta_3}(1)$		
.62			$NdK_{\alpha_2}(1)$
.72	$EuK_{\beta_1}(2)$	$IK_{\beta_2}(1)$, $LaK_{\alpha_2}(1)$	
.76	$EuK_{\beta_3}(2)$		$BaK_{\beta_1}(1)$
.78			$BaK_{\beta_3}(1)$
.84	$SmK_{\beta_2}(2)$		
.86			$PrK_{\alpha_1}(1)$
.90	$RhK_{\beta_2}(1)$, $CdK_{\alpha_1}(1)$		
.92			$CsK_{\beta_2}(1)$
.96		$IK_{\beta_1}(1)$	
.98	$CdK_{\alpha_2}(1)$	$IK_{\beta_3}(1)$	
11.00			$PrK_{\alpha_2}(1)$
.02		$BaK_{\alpha_1}(1)$	
.10	$RhK_{\beta_1}(1)$		
.12	$SmK_{\beta_1}(2)$, $RhK_{\beta_3}(1)$	$BaK_{\alpha_2}(1)$	
.14	$SmK_{\beta_3}(2)$		
.16		$TeK_{\beta_2}(1)$	
.18			$CsK_{\beta_1}(1)$
.22			$CsK_{\beta_3}(1)$
.28			$CeK_{\alpha_1}(1)$

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
11.38	$AgK\alpha_1$(1)		
.42		$TeK\beta_1$(1), $TeK\beta_3$(1)	$CeK\alpha_2$(1)
.44	$RuK\beta_2$(1)	$CsK\alpha_1$(1)	
.48	$AgK\alpha_2$(1), $PmK\beta_1$(2) $PmK\beta_3$(2)		
.56		$CsK\alpha_2$(1)	
.64		$SbK\beta_2$(1)	
.66	$NdK\beta_2$(2), $RuK\beta_1$(1), $RuK\beta_3$(1)		
.70			$LaK\alpha_1$(1)
.84			$LaK\alpha_2$(1)
.86			$IK\beta_2$(1)
.90		$SbK\beta_1$(1), $SbK\beta_3$(1)	
.92	$PdK\alpha_1$(1)		
.94	$NdK\beta_1$(2)		
.98	$NdK\beta_3$(2)		
12.00	$PdK\alpha_2$(1)		
.02	$TcK\beta_2$(1)		
.08	$PrK\beta_2$(2)		
.12			$IK\beta_1$(1)
.14			$IK\beta_3$(1)
.16	$EuK\alpha_1$(2)	$SnK\beta_2$(1)	$BaK\alpha_1$(1)
.24	$TcK\beta_1$(1)		
.30			$BaK\alpha_2$(1)
.34	$EuK\alpha_2$(2)		
.36			$TeK\beta_2$(1)
.38	$PrK\beta_1$(2)	$IK\alpha_1$(1)	
.42	$PrK\beta_3$(2)	$SnK\beta_1$(1)	
.44		$SnK\beta_3$(1)	
.50	$RhK\alpha_1$(1)	$IK\alpha_2$(1)	
.52	$UL\gamma_1$(1)		
.56	$CeK\beta_2$(2)		
.58	$RhK\alpha_2$(1), $SmK\alpha_1$(2)		
.64	$MoK\beta_2$(1)		$TeK\beta_1$(1), $TeK\beta_3$(1), $CsK\alpha_1$(1)
.72		$InK\beta_2$(1)	
.78	$SmK\alpha_2$(2)		
.80			$CsK\alpha_2$(1)
.86	$CeK\beta_1$(2)		
.88	$CeK\beta_3$(2), $MoK\beta_1$(1), $MoK\beta_3$(1)		$SbK\beta_2$(1)
.90	$PaL\gamma_1$(1)	$TeK\alpha_1$(1)	
.98		$InK\beta_1$(1)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
13.00		$InK_{\beta_3}(1)$	
.02		$TeK_{\alpha_2}(1)$	
.04	$LaK_{\beta_2}(2)$		
.06	$PmK_{\alpha_1}(2)$		
.10	$RuK_{\alpha_1}(1)$		
.18	$RuK_{\alpha_2}(1)$		$SbK_{\beta_1}(1)$, $SbK_{\beta_3}(1)$
.22	$PmK_{\alpha_2}(2)$		
.28		$CdK_{\beta_2}(1)$	
.30	$ThL_{\gamma_1}(1)$		
.32	$CbK_{\beta_2}(1)$		
.36	$LaK_{\beta_1}(2)$		
.38	$LaK_{\beta_3}(2)$		
.44		$SbK_{\alpha_1}(1)$	
.46			$SnK_{\beta_2}(1)$
.52	$NdK_{\alpha_1}(2)$		
.56	$CbK_{\beta_1}(1)$, $BaK_{\beta_2}(2)$	$SbK_{\alpha_2}(1)$	
.58	$CbK_{\beta_3}(1)$	$CdK_{\beta_1}(1)$	
.60		$CdK_{\beta_3}(1)$	
.70	$NdK_{\alpha_2}(2)$		$IK_{\alpha_1}(1)$
.74	$TcK_{\alpha_1}(1)$		
.76			$SnK_{\beta_1}(1)$, $SnK_{\beta_3}(1)$
.84	$TcK_{\alpha_2}(1)$		$IK_{\alpha_2}(1)$
.88	$BaK_{\beta_1}(2)$		
.92	$BaK_{\beta_3}(2)$	$AgK_{\beta_2}(1)$	
14.02	$PrK_{\alpha_1}(2)$	$SnK_{\alpha_1}(1)$	
.06	$ZrK_{\beta_2}(1)$		$InK_{\beta_2}(1)$
.10	$CsK_{\beta_2}(2)$		
.14		$SnK_{\alpha_2}(1)$	
.20	$PrK_{\alpha_2}(2)$	$AgK_{\beta_1}(1)$	
.22		$AgK_{\beta_3}(1)$	
.26			$TeK_{\alpha_1}(1)$
.30	$ZrK_{\beta_1}(1)$, $ZrK_{\beta_3}(1)$		
.36			$InK_{\beta_1}(1)$
.38			$InK_{\beta_3}(1)$
.40			$TeK_{\alpha_2}(1)$
.44	$CsK_{\beta_1}(2)$		
.46	$MoK_{\alpha_1}(1)$, $CsK_{\beta_3}(2)$		
.48	$UL_{\beta_3}(1)$		
.56	$MoK_{\alpha_2}(1)$, $CeK_{\alpha_1}(2)$		
.58		$PdK_{\beta_2}(1)$	
.64		$InK_{\alpha_1}(1)$	
.68	$UL_{\beta_1}(1)$		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
14.70		$EuK_{\beta_2}(2)$	$CdK_{\beta_2}(1)$
.74	$CeK_{\alpha_2}(2)$		
.76		$InK_{\alpha_2}(1)$	
.84	$YK_{\beta_2}(1)$		
.86			$SbK_{\alpha_1}(1)$
.88		$PdK_{\beta_1}(1)$	
.90		$PdK_{\beta_3}(1)$	
.92	$PaL_{\beta_3}(1)$		
15.00			$CdK_{\beta_1}(1)$
.02			$SbK_{\alpha_2}(1)$
.04			$CdK_{\beta_3}(1)$
.08		$EuK_{\beta_1}(2)$	
.10	$YK_{\beta_1}(1)$, $YK_{\beta_3}(1)$, $LaK_{\alpha_1}(2)$		
.12	$PaL_{\beta_1}(1)$	$EuK_{\beta_3}(2)$	
.20	$CbK_{\alpha_1}(1)$		
.22		$SmK_{\beta_2}(2)$	
.24	$UL_{\beta_4}(1)$		
.30	$LaK_{\alpha_2}(2)$, $NbK_{\alpha_2}(1)$, $IK_{\beta_2}(2)$	$RhK_{\beta_2}(1)$, $CdK_{\alpha_1}(1)$	
.38	$ThL_{\beta_3}(1)$, $UL_{\beta_2}(1)$		
.40			$AgK_{\beta_2}(1)$
.42		$CdK_{\alpha_2}(1)$	
.50			$SnK_{\alpha_1}(1)$
.60	$ThL_{\beta_1}(1)$	$RhK_{\beta_1}(1)$	
.62		$RhK_{\beta_3}(1)$, $SmK_{\beta_1}(2)$	
.64	$IK_{\beta_1}(2)$		$SnK_{\alpha_2}(1)$
.66		$SmK_{\beta_3}(2)$	
.68	$IK_{\beta_3}(2)$		
.70	$PaL_{\beta_4}(1)$, $BaK_{\alpha_1}(2)$		
.72	$SrK_{\beta_2}(1)$, $EuK_{\beta_2}(3)$		$AgK_{\beta_1}(1)$
.74			$AgK_{\beta_3}(1)$
.78	$PaL_{\beta_2}(1)$		
.88	$BaK_{\alpha_2}(2)$		
.94	$TeK_{\beta_2}(2)$		
.96	$SrK_{\beta_1}(1)$		
.98	$SrK_{\beta_3}(1)$		
16.00		$AgK_{\alpha_1}(1)$	
.04	$ZrK_{\alpha_1}(1)$		
.06		$RuK_{\beta_2}(1)$	
.08	$UL_{\beta_6}(1)$		
.12	$ZrK_{\alpha_2}(1)$, $EuK_{\beta_1}(3)$	$AgK_{\alpha_2}(1)$	
.14		$PmK_{\beta_1}(2)$, $PmK_{\beta_3}(2)$	$PdK_{\beta_2}(1)$
.18	$ThL_{\beta_2}(1)$, $ThL_{\beta_4}(1)$, $EuK_{\beta_3}(3)$		$InK_{\alpha_1}(1)$

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
16.26			EuK_{β_2} (2)
.28	SmK_{β_2} (3)		
.32	TeK_{β_1} (2), TeK_{β_3} (2), CsK_{α_1} (2)		
.34			InK_{α_2} (1)
.38		RuK_{β_1} (1), NdK_{β_2} (2)	
.40		RuK_{β_3} (1)	
.42	UL_{η} (1)		
.46			PdK_{β_1} (1)
.48	PaL_{β_6} (1)		PdK_{β_3} (1)
.52	CsK_{α_2} (2)		
.58	BiL_{γ_1} (1)		
.64	SbK_{β_2} (2)		
.66	RbK_{β_2} (1)		
.68			EuK_{β_1} (2)
.70	SmK_{β_1} (3)		
.72			EuK_{β_3} (2)
.74	SmK_{β_3} (3)	PdK_{α_1} (1)	
.78		NdK_{β_1} (2)	
.82		NdK_{β_3} (2)	
.84			SmK_{β_2} (2)
.88	ThL_{β_6} (1)	PdK_{α_2} (1)	
.90	RbK_{β_3} (1), RbK_{β_1} (1), YK_{α_1} (1)	TcK_{β_2} (1)	
.92	PaL_{η} (1)		RhK_{β_2} (1), CdK_{α_1} (1)
.98		PrK_{β_2} (2)	
17.00	YK_{α_2} (1)		
.02	SbK_{β_1} (2), SbK_{β_3} (2)		
.06			CdK_{α_2} (1)
.08		EuK_{α_1} (2)	
.12	PbL_{γ_1} (1)		
.20		TcK_{β_1} (1)	
.26	PmK_{β_1} (3), PmK_{β_3} (3)		RhK_{β_1} (1)
.28			RhK_{β_3} (1), SmK_{β_1} (2)
.32			SmK_{β_3} (2)
.36		EuK_{α_2} (2)	
.38	SnK_{β_2} (2)		
.42		PrK_{β_1} (2)	
.44	ThL_{η} (1)		
.46		PrK_{β_3} (2)	
.52	NdK_{β_2} (3)		
.56		RhK_{α_1} (1)	
.60		UL_{γ_1} (1)	
.64		CeK_{β_2} (2)	
.68	IK_{α_1} (2)	RhK_{α_2} (1), SmK_{α_1} (2)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
17.70	TlL_{γ_1}(1)		AgK_{α_1}(1)
.76	SnK_{β_1}(2)	MoK_{β_2}(1)	
.78	SnK_{β_3}(2)		RuK_{β_2}(1)
.84			AgK_{α_2}(1)
.86	SrK_{α_1}(1), IK_{α_2}(2)		PmK_{β_1}(2), PmK_{β_3}(2)
.94	SrK_{α_2}(1)		
.96	NdK_{β_1}(3)	SmK_{α_2}(2)	
18.00	NdK_{β_3}(3)		
.08		CeK_{β_1}(2)	
.10		MoK_{β_1}(1)	
.12		MoK_{β_3}(1), CeK_{β_3}(2)	RuK_{β_1}(1), NdK_{β_2}(2)
.14		PaL_{γ_1}(1)	RuK_{β_3}(1)
.16	InK_{β_2}(2)		
.18	PrK_{β_2}(3)		
.28	EuK_{α_1}(3)		
.30	HgL_{γ_1}(1)		
.34		LaK_{β_2}(2)	
.36		PmK_{α_1}(2)	
.40		RuK_{α_1}(1)	
.42	TeK_{α_1}(2)		
.54		RuK_{α_2}(1)	PdK_{α_1}(1)
.56	InK_{β_1}(2), EuK_{α_2}(3)		NdK_{β_1}(2)
.58	UL_{α_1}(1), InK_{β_3}(2)		
.60	TeK_{α_2}(2)	PmK_{α_2}(2)	
.62	PrK_{β_1}(3)		NdK_{β_3}(2)
.68	PrK_{β_3}(3)		PdK_{α_2}(1)
.70		ThL_{γ_1}(1)	TcK_{β_2}(1)
.74		CbK_{β_2}(1)	
.78	BrK_{β_2}(1)	LaK_{β_1}(2)	
.80			PrK_{β_2}(2)
.82	UL_{α_2}(1)	LaK_{β_3}(2)	
.88	CeK_{β_2}(3)		
.90	RbK_{α_1}(1)		EuK_{α_1}(2)
.92	AuL_{γ_1}(1), SmK_{α_1}(3)		
.98	RbK_{α_2}(1), CdK_{β_2}(2)		
19.00		NdK_{α_1}(2)	
.04	PaL_{α_1}(1), BrK_{β_1}(1)		TcK_{β_1}(1)
.06		CbK_{β_1}(1), BaK_{β_2}(2)	
.08		CbK_{β_3}(1)	
.16	BiL_{β_3}(1)		
.20	SbK_{α_1}(2)		EuK_{α_2}(2)
.22	SmK_{α_2}(3)		
.26			PrK_{β_1}(2)
.28	PaL_{α_2}(1)	NdK_{α_2}(2)	
.32		TcK_{α_1}(1)	PrK_{β_3}(2)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
19.34	CeK_{β_1}(3)		
.38	CeK_{β_3}(3)		
.40	SbK_{α_2}(2), CdK_{β_1}(2)		
.42	CdK_{β_3}(2)		RhK_{α_1}(1)
.44	BiL_{β_1}(1)		
.46		TcK_{α_2}(1)	
.48			UL_{γ_1}(1)
.50	BiL_{β_2}(1)		
.52	ThL_{α_1}(1)	BaK_{β_1}(2)	CeK_{β_2}(2)
.56	PtL_{γ_1}(1)	BaK_{β_3}(2)	RhK_{α_2}(1)
.58			SmK_{α_1}(2)
.62	LaK_{β_2}(3)		
.64	PmK_{α_1}(3)		
.68			MoK_{β_2}(1)
.72		PrK_{α_1}(2)	
.76	ThL_{α_2}(1)	ZrK_{β_2}(1)	
.80	PbL_{β_3}(1)		
.82		CsK_{β_2}(2)	
.86			SmK_{α_2}(2)
.90	AgK_{β_2}(2), PmK_{α_2}(3)		
.96	BiL_{β_4}(1)		
.98		PrK_{α_2}(2)	
20.00			CeK_{β_1}(2)
.02	SeK_{β_2}(1)		
.04	SnK_{α_1}(2)		MoK_{β_1}(1), MoK_{β_3}(1)
.06			CeK_{β_3}(2)
.08	PbL_{β_1}(1), PbL_{β_2}(1)		PaL_{γ_1}(1)
.10	LaK_{β_1}(3)	ZrK_{β_1}(1)	
.12		ZrK_{β_3}(1)	
.14	LaK_{β_3}(3)		
.22	SnK_{α_2}(2)		
.24	IrL_{γ_1}(1)		
.26	SeK_{β_1}(1)		
.30	BiL_{β_6}(1), AgK_{β_1}(2)	CsK_{β_1}(2)	LaK_{β_2}(2)
.32		MoK_{α_1}(1)	PmK_{α_1}(2)
.34	AgK_{β_3}(2), NdK_{α_1}(3)		
.36		CsK_{β_3}(2), UL_{β_3}(1)	RuK_{α_1}(1)
.40	BaK_{β_2}(3)		
.44	TlL_{β_3}(1)		
.46		MoK_{α_2}(1), CeK_{α_1}(2)	
.52			RuK_{α_2}(1)
.58	PbL_{β_4}(1)		PmK_{α_2}(2)
.62	NdK_{α_2}(3)		
.64	TlL_{β_2}(1)	UL_{β_1}(1)	
.70			ThL_{γ_1}(1)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
20.72			$NbK_{\beta_2}(1)$
.74	$TlL_{\beta_1}(1)$	$CeK_{\alpha_2}(2)$	
.78			$LaK_{\beta_1}(2)$
.84	$PdK_{\beta_2}(2)$		$LaK_{\beta_3}(2)$
.86	$PbL_{\beta_6}(1)$		
.88		$YK_{\beta_2}(1)$	
.90	$BaK_{\beta_1}(3)$		
.92	$InK_{\alpha_1}(2)$		
.94	$OsL_{\gamma_1}(1)$, $BaK_{\beta_3}(3)$		
.98		$PaL_{\beta_3}(1)$	
21.00	$EuK_{\beta_2}(4)$		
.04			$NdK_{\alpha_1}(2)$
.10	$HgL_{\beta_3}(1)$, $PrK_{\alpha_1}(3)$		$CbK_{\beta_1}(1)$, $BaK_{\beta_2}(2)$
.12	$InK_{\alpha_2}(2)$		$CbK_{\beta_3}(1)$
.20	$CsK_{\beta_2}(3)$		
.24	$TlL_{\beta_4}(1)$	$YK_{\beta_1}(1)$	
.26	$HgL_{\beta_2}(1)$, $BrK_{\alpha_1}(1)$	$YK_{\beta_3}(1)$, $LaK_{\alpha_1}(2)$	
.28	$PdK_{\beta_1}(2)$	$PaL_{\beta_1}(1)$	
.30	$PdK_{\beta_3}(2)$		
.34	$BrK_{\alpha_2}(1)$		$NdK_{\alpha_2}(2)$
.36	$AsK_{\beta_2}(1)$		
.38	$PrK_{\alpha_2}(3)$		
.40		$CbK_{\alpha_1}(1)$	$TcK_{\alpha_1}(1)$
.44	$HgL_{\beta_1}(1)$	$UL_{\beta_4}(1)$	
.46	$TlL_{\beta_6}(1)$		
.52		$CbK_{\alpha_2}(1)$, $LaK_{\alpha_2}(2)$	
.54		$IK_{\beta_2}(2)$	$TcK_{\alpha_2}(1)$
.56	$EuK_{\beta_1}(4)$		
.60			$BaK_{\beta_1}(2)$
.62	$AsK_{\beta_1}(1)$, $EuK_{\beta_3}(4)$		
.64	$BiL_{\eta}(1)$	$ThL_{\beta_3}(1)$, $UL_{\beta_2}(1)$	
.66			$BaK_{\beta_3}(2)$
.68	$ReL_{\gamma_1}(1)$		
.74	$CsK_{\beta_1}(3)$		
.78	$CsK_{\beta_3}(3)$, $SmK_{\beta_2}(4)$		
.80	$UL_{\ell}(1)$		
.82			$PrK_{\alpha_1}(2)$
.84	$AuL_{\beta_3}(1)$		
.88	$AuL_{\beta_2}(1)$, $RhK_{\beta_2}(2)$, $CdK_{\alpha_1}(2)$		$ZrK_{\beta_2}(1)$
.90	$HgL_{\beta_4}(1)$, $CeK_{\alpha_1}(3)$		
.94		$ThL_{\beta_1}(1)$	$CsK_{\beta_2}(2)$
22.02		$IK_{\beta_1}(2)$	
.06	$HgL_{\beta_6}(1)$, $CdK_{\alpha_2}(2)$	$IK_{\beta_3}(3)$	
.08		$PaL_{\beta_4}(1)$	
.10		$SrK_{\beta_2}(1)$, $BaK_{\alpha_1}(2)$	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
22.12		EuK_{β_2}(3)	PrK_{α_2}(2)
.16	AuL_{β_1}(1)		
.18	CeK_{α_2}(3)		
.20		PaL_{β_2}(1)	
.26			ZrK_{β_1}(1), ZrK_{β_3}(1)
.30	PaL_{l} (1)		
.32	RhK_{β_1}(2)		
	SmK_{β_1}(4)		
.34	PbL_{η} (1), RhK_{β_3}(2)		
.36		BaK_{α_2}(2)	
.40	SmK_{β_3}(4)		
.44		TeK_{β_2}(2)	
.46		SrK_{β_1}(1)	
.48	WL_{γ_1} (1)	SrK_{β_3}(1)	CsK_{β_1}(2)
.50			MoK_{α_1}(1)
.52			CsK_{β_3}(2), UL_{β_3}(1)
.54	PtL_{β_2}(1)	ZrK_{α_1}(1)	
.58	PtL_{β_3}(1)		
.60	SeK_{α_1}(1)		
.62		UL_{β_6}(1)	
.64	AuL_{β_4}(1)		
.66			MoK_{α_2}(1), CeK_{α_1}(2)
.68	SeK_{α_2}(1)	ZrK_{α_2}(1), EuK_{β_1}(3)	
.72	AuL_{β_6}(1)		
.74	LaK_{α_1}(3)		
.76		ThL_{β_2}(1), ThL_{β_4}(1), EuK_{β_3}(3)	
.80	ThL_{l} (1)		
.84	GeK_{β_2}(1)		UL_{β_1}(1)
.88	AgK_{α_1}(2)		
.90	PtL_{β_1}(1)		
.92		SmK_{β_2}(3)	
.94			CeK_{α_2}(2)
.96		TeK_{β_1}(2), TeK_{β_3}(2)	
.98	RuK_{β_2}(2)	CsK_{α_1}(2)	
23.04	LaK_{α_2}(3)		
.06	IK_{β_2}(3)		
.08	PmK_{β_1}(4), PmK_{β_3}(4)		
	TlL_{η} (1), AgK_{α_2}(2)		
.10	GeK_{β_1}(1)	UL_{η}(1)	
.12			YK_{β_2}(1)
.18		PaL_{β_6}(1)	
.22	IrL_{β_2}(1)		
.24		CsK_{α_2}(2)	PaL_{β_3}(1)
.28	TaL_{γ_1}(1)		
.34	IrL_{β_3}(1)	BiL_{γ_1}(1)	
.36	PtL_{β_4}(1)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
23.40	BiL_{α_1}(1), PtL_{β_6}(1)		
.42	RuK_{β_1}(2), NdK_{β_2}(4)	SbK_{β_2}(2)	
.44		RbK_{β_2}(1)	
.46	RuK_{β_3}(2)		
.50			YK_{β_1}(1)
.52		SmK_{β_1}(3)	
.54			YK_{β_3}(1), LaK_{α_1}(2)
.56	IK_{β_1}(3)		PaL_{β_1}(1)
.58		SmK_{β_3}(3)	
.62	IK_{β_3}(3)		
.64	BiL_{α_2}(1), BaK_{α_1}(3)		
.68			CbK_{α_1}(1)
.70	IrL_{β_1}(1)		
.74			UL_{β_4}(1)
.78		RbK_{β_1}(1), ThL_{β_6}(1)	
.80		RbK_{β_3}(1), YK_{α_1}(1)	
.82	HgL_η(1)	PaL_η(1)	NbK_{α_2}(1), LaK_{α_2}(2)
.84			IK_{β_2}(2)
.92	BaK_{α_2}(3)	YK_{α_2}(1)	
.96	PdK_{α_1}(2)	SbK_{β_1}(2), SbK_{β_3}(2)	ThL_{β_3}(1), UL_{β_2}(1)
.98	OsL_{β_2}(1)		
24.02	TeK_{β_2}(3), NdK_{β_1}(4)		
.04	PbL_{α_1}(1)		
.08	AsK_{α_1}(1), NdK_{β_3}(4)		
.12	IrL_{β_6}(1)	PbL_{γ_1}(1)	
.14	HfL_{γ_1}(1), IrL_{β_4}(1)		
.16	AsK_{α_2}(1), PdK_{α_2}(2)		
.18	TcK_{β_2}(2)		
.28	PbL_{α_2}(1)		
.30		PmK_{β_1}(3), PmK_{β_3}(3)	ThL_{β_1}(1)
.32	PrK_{β_2}(4)		
.38			IK_{β_1}(2)
.44	EuK_{α_1}(4)		IK_{β_3}(2)
.46		SnK_{β_2}(2)	PaL_{β_4}(1), BaK_{α_1}(2)
.48			SrK_{β_2}(1), EuK_{β_2}(3)
.50	GaK_{β_2}(1)		
.52	OsL_{β_1}(1)		
.54		ThL_η (1)	
.58	TeK_{β_1}(3), TeK_{β_3}(3)		PaL_{β_2}(1)
.60	CsK_{α_1}(3)		
.62	AuL_η (1)		
.64	TcK_{β_1}(2)		
.68		NdK_{β_2}(3)	
.70	ReL_{β_2}(1)		
.72	TlL_{α_1}(1), GaK_{β_1}(1)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
24.76			$BaK_{\alpha_2}(2)$
.84	$EuK_{\alpha_2}(4)$		
.86			$SrK_{\beta_1}(1)$, $TeK_{\beta_2}(2)$
.88	$CsK_{\alpha_2}(3)$		
.90		$IK_{\alpha_1}(2)$	$SrK_{\beta_3}(1)$
.92	$PrK_{\beta_1}(4)$	$TlL_{\gamma_1}(1)$	
.96	$TlL_{\alpha_2}(1)$		$ZrK_{\alpha_1}(1)$
.98	$PrK_{\beta_3}(4)$		
25.00	$ReL_{\beta_3}(1)$	$SnK_{\beta_1}(2)$	
.04	$LuL_{\gamma_1}(1)$	$SnK_{\beta_3}(2)$	$UL_{\beta_6}(1)$
.06	$SbK_{\beta_2}(3)$		
.10			$ZrK_{\alpha_2}(1)$
.12	$RhK_{\alpha_1}(2)$		$EuK_{\beta_1}(3)$
.14		$SrK_{\alpha_1}(1)$	
.16		$IK_{\alpha_2}(2)$	
.18	$UL_{\gamma_1}(2)$		
.20			$ThL_{\beta_2}(1)$, $ThL_{\beta_4}(1)$, $EuK_{\beta_3}(3)$
.26	$CeK_{\beta_2}(4)$		
.28		$SrK_{\alpha_2}(1)$, $NdK_{\beta_1}(3)$	
.30	$RhK_{\alpha_2}(2)$		
.32	$SmK_{\alpha_1}(4)$		
.34		$NdK_{\beta_3}(3)$	
.38	$ReL_{\beta_1}(1)$		$SmK_{\beta_2}(3)$
.42	$HgL_{\alpha_1}(1)$		
.44	$MoK_{\beta_2}(2)$		$TeK_{\beta_1}(2)$, $TeK_{\beta_3}(2)$, $CsK_{\alpha_1}(2)$
.46	$PtL_{\eta}(1)$		
.50	$WL_{\beta_2}(1)$		
.58		$InK_{\beta_2}(2)$	$UL_{\eta}(1)$
.60		$PrK_{\beta_2}(3)$	
.62	$ReL_{\beta_6}(1)$		
.64	$SbK_{\beta_1}(3)$, $SbK_{\beta_3}(3)$		
.66	$HgL_{\alpha_2}(1)$		
.68			$PaL_{\beta_6}(1)$
.70	$GeK_{\alpha_1}(1)$, $SmK_{\alpha_2}(4)$		
.74		$EuK_{\alpha_1}(3)$	$CsK_{\alpha_2}(2)$
.76		$HgL_{\gamma_1}(1)$	
.78	$GeK_{\alpha_2}(1)$		
.80	$ReL_{\beta_4}(1)$		
.84			$BiL_{\gamma_1}(1)$
.88	$WL_{\beta_3}(1)$, $CeK_{\beta_1}(4)$		
.92	$MoK_{\beta_1}(2)$		
.94	$MoK_{\beta_3}(2)$, $CeK_{\beta_3}(4)$	$TeK_{\alpha_1}(2)$	$RbK_{\beta_2}(1)$, $SbK_{\beta_2}(2)$
.98	$PaL_{\gamma_1}(2)$, $YbL_{\gamma_1}(1)$		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
26.04			SmK_{β_1}(3)
.12			SmK_{β_3}(3)
.14		InK_{β_1}(2)	
.16	AuL_{α_1}(1)	EuK_{α_2}(3)	
.18	SnK_{β_2}(3)	InK_{β_3}(2), UL_{α_1}(1)	
.22		TeK_{α_2}(2)	
.24		PrK_{β_1}(3)	
.26	LaK_{β_2}(4)		
.28	WL_{β_1}(1)		
.30	PmK_{α_1}(4)	PrK_{β_3}(3)	
.32	IrL_η (1), ZnK_{β_2}(1)		
.34	TaL_{β_2}(1), EuK_{β_2}(5)		RbK_{β_1}(1), YK_{α_1}(1), ThL_{β_6}(1)
.36	RuK_{α_1}(2)		
.38			RbK_{β_3}(1), PaL_η(1)
.40	AuL_{α_2}(1)		
.44	WL_{β_6}(1)		
.48		BrK_{β_2}(1)	YK_{α_2}(1)
.52			SbK_{β_1}(2), SbK_{β_3}(2)
.54		UL_{α_2}(1)	
.56	ZnK_{β_1}(1), RuK_{α_2}(2)		
.60		CeK_{β_2}(3)	
.62		RbK_{α_1}(1)	
.64	PmK_{α_2}(4)		
.66	IK_{α_1}(3)	AuL_{γ_1}(1), SmK_{α_1}(3)	
.68	WL_{β_4}(1)		
.70			PbL_{γ_1}(1)
.74		RbK_{α_2}(1)	
.76		CdK_{β_2}(2)	
.78	ThL_{γ_1}(2), SnK_{β_1}(3)		
.80	TaL_{β_3}(1), SnK_{β_3}(3)		
.82	CbK_{β_2}(2)		
.84		BrK_{β_1}(1), PaL_{α_1}(1)	
.90	LaK_{β_1}(4)		
.92	PtL_{α_1}(1)		PmK_{β_1}(3), PmK_{β_3}(3)
.94	IK_{α_2}(3)		
.96	LaK_{β_3}(4)		
.98	TmL_{β_1}(1)		
27.00	BiL_l (1)	BiL_{β_3}(1)	
.04	EuK_{β_1}(5)		
.06		SbK_{α_1}(2)	
.08		SmK_{α_2}(3)	
.10			SnK_{β_2}(2)
.12	EuK_{β_3}(5)		
.16	PtL_{α_2}(1)		
.18		PaL_{α_2}(1)	ThL_η(1)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
27.20	HfL_{β_2}(1)		
.22	TaL_{β_1}(1), NdK_{α_1}(4)		
.26		CeK_{β_1}(3)	
.30	TaL_{β_6}(1), BaK_{β_2}(4)		
.32	CbK_{β_1}(2), SmK_{β_2}(5)	SbK_{α_2}(2), CeK_{β_3}(3)	NdK_{β_2}(3)
.34	CbK_{β_3}(2)	CdK_{β_1}(2)	
.38	InK_{β_2}(3)	CdK_{β_3}(2)	
.40		BiL_{β_1}(1)	
.50	GaK_{α_1}(1)	BiL_{β_2}(1)	
.52		ThL_{α_1}(1)	
.56		PtL_{γ_1}(1)	
.58	GaK_{α_2}(1)		IK_{α_1}(2)
.60	TaL_{β_4}(1)		TlL_{γ_1}(1)
.62	NdK_{α_2}(4)		
.66		LaK_{β_2}(3)	
.70	PbL_{γ}(1), TcK_{α_1}(2)	PmK_{α_1}(3)	SnK_{β_1}(2)
.72	IrL_{α_1}(1)		
.74			SnK_{β_3}(2)
.76	HfL_{β_3}(1)		
.78	TeK_{α_1}(3)		
.86	TcK_{α_2}(2)	ThL_{α_2}(1)	SrK_{α_1}(1)
.88			IK_{α_2}(2)
.90		PbL_{β_3}(1)	
.96	IrL_{α_2}(1)		
.98	InK_{β_1}(3), BaK_{β_1}(4)		
28.00			SrK_{α_2}(1), NdK_{β_1}(3)
.02	ErL_{γ_1}(1), InK_{β_3}(3), SmK_{β_1}(5)		
.04	BaK_{β_3}(3)	AgK_{β_2}(2), PmK_{α_2}(3)	
.08	TeK_{α_2}(3)		NdK_{β_3}(3)
.10	SmK_{β_3}(5)		
.12	LuL_{β_2}(1)		
.14		BiL_{β_4}(1)	
.20	HfL_{β_1}(1), HfL_{β_6}(1), ReL_{η}(1)		
.22		SeK_{β_2}(1)	
.26	PrK_{α_1}(4)	SnK_{α_1}(2)	
.30		PbL_{β_1}(1), PbL_{β_2}(1)	
.34	CuK_{β_2}(1), ZrK_{β_2}(2)	LaK_{β_1}(3)	InK_{β_2}(2)
.36			PrK_{β_2}(3)
.40	CsK_{β_2}(4)	LaK_{β_3}(3)	
.42	TlL_{γ}(1)		
.52		SnK_{α_2}(2)	EuK_{α_1}(3)
.54	CuK_{β_1}(1)	IrL_{γ_1}(1)	HgL_{γ_1}(1)
.56	OsL_{α_1}(1)		
.58	HfL_{β_4}(1)	SeK_{β_1}(1)	
.62		BiL_{β_6}(1)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
28.64	$CdK_{\beta_2}(3)$, $PrK_{\alpha_2}(4)$	$AgK_{\beta_1}(2)$	
.68		$AgK_{\beta_3}(2)$, $NdK_{\alpha_1}(3)$	
.74			$TeK_{\alpha_1}(2)$
.76	$LuL_{\beta_3}(1)$	$BaK_{\beta_2}(3)$	
.78	$OsL_{\alpha_2}(1)$		
.82	$ZrK_{\beta_1}(2)$	$TlL_{\beta_3}(1)$	
.84	$ZrK_{\beta_3}(2)$		
.96	$PmK_{\beta_1}(5)$, $PmK_{\beta_3}(5)$		$InK_{\beta_1}(2)$
.98	$SbK_{\alpha_1}(3)$		$EuK_{\alpha_2}(3)$
29.00			$InK_{\beta_3}(2)$, $UL_{\alpha_1}(1)$
.04		$PbL_{\beta_4}(1)$	$TeK_{\alpha_2}(2)$
.08	$YbL_{\beta_2}(1)$	$NdK_{\alpha_2}(3)$	$PrK_{\beta_1}(3)$
.10	$HoL_{\gamma_1}(1)$, $CsK_{\beta_1}(4)$		
.12	$LuL_{\beta_6}(1)$	$TlL_{\beta_2}(1)$	
.14	$MoK_{\alpha_1}(2)$		$PrK_{\beta_3}(3)$
.18	$UL_{\beta_3}(2)$, $CsK_{\beta_3}(4)$		
.20	$WL_{\eta}(1)$, $HgL_{\ell}(1)$		
.24	$LuL_{\beta_1}(1)$		
.26	$SbK_{\alpha_2}(3)$	$TlL_{\beta_1}(1)$	
.28	$CdK_{\beta_1}(3)$		
.32	$CdK_{\beta_3}(3)$		$BrK_{\beta_2}(1)$
.34	$MoK_{\alpha_2}(2)$, $CeK_{\alpha_1}(4)$		
.40		$PdK_{\beta_2}(2)$	$UL_{\alpha_2}(1)$
.42	$NdK_{\beta_2}(5)$	$PbL_{\beta_6}(1)$	
.44	$ReL_{\alpha_1}(1)$		
.46		$BaK_{\beta_1}(3)$	$CeK_{\beta_2}(3)$
.48	$ZnK_{\alpha_1}(1)$		
.50			$RbK_{\alpha_1}(1)$
.52		$InK_{\alpha_1}(2)$, $BaK_{\beta_3}(3)$	$AuL_{\gamma_1}(1)$
.54		$OsL_{\gamma_1}(1)$	$SmK_{\alpha_1}(3)$
.56	$ZnK_{\alpha_2}(1)$		
.58	$UL_{\beta_1}(2)$, $LuL_{\beta_4}(1)$		
.62		$EuK_{\beta_2}(4)$	
.64			$RbK_{\alpha_2}(1)$, $CdK_{\beta_2}(2)$
.68	$ReL_{\alpha_2}(1)$		
.72	$CeK_{\alpha_2}(4)$		$BrK_{\beta_1}(1)$
.74			$PaL_{\alpha_1}(1)$
.76		$HgL_{\beta_3}(1)$, $PrK_{\alpha_1}(3)$	
.78		$InK_{\alpha_2}(2)$	
.84	$YbL_{\beta_3}(1)$		
.92		$CsK_{\beta_2}(3)$	$BiL_{\beta_3}(1)$
.96	$YK_{\beta_2}(2)$	$TlL_{\beta_4}(1)$	
.98		$BrK_{\alpha_1}(1)$, $HgL_{\beta_2}(1)$	$SbK_{\alpha_1}(2)$

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
30.00	AuL_l (1)		SmK_{α_2}(3)
.02		PdK_{β_1}(2)	
.04	AgK_{β_2}(3)		
.06		PdK_{β_3}(2)	
.08	TmL_{β_2}(1)		
.10	PaL_{β_3}(2)	BrK_{α_2}(1)	
.12	YbL_{β_6}(1)		PaL_{α_2}(1)
.14	NdK_{β_1}(5)	AsK_{β_2}(1)	
.16		PrK_{α_2}(3)	
.20			CeK_{β_1}(3)
.22	NdK_{β_3}(5)		
.24	TaL_η (1)	HgL_{β_1}(1)	
.26	SnK_{α_1}(3)		
.28	DyL_{γ_1}(1)	TlL_{β_6}(1)	SbK_{α_2}(2), CeK_{β_3}(3)
.30			CdK_{β_1}(2)
.34	YbL_{β_1}(1)		CdK_{β_3}(2)
.36	WL_{α_1}(1)		BiL_{β_1}(1)
.42		EuK_{β_1}(4)	
.46	YK_{β_1}(2)		BiL_{β_2}(1)
.48	YK_{β_3}(2)		ThL_{α_1}(1)
.50	LaK_{α_1}(4)	AsK_{β_1}(1), EuK_{β_3}(4)	
.52	PaL_{β_1}(2), PrK_{β_2}(5)		
.54	SnK_{α_2}(3)	BiL_η (1)	
.56			PtL_{γ_1}(1)
.58	WL_{α_2}(1)		
.60		ReL_{γ_1}(1)	
.62	NiK_{β_2}(1)		
.64			LaK_{β_2}(3)
.66	YbL_{β_4}(1), AgK_{β_1}(3)	CsK_{β_1}(3)	
.68			PmK_{α_1}(3)
.70	NbK_{α_1}(2), EuK_{α_1}(5)		
.72	AgK_{β_3}(3)		
.74		CsK_{β_3}(3), SmK_{β_2}(4)	
.76	UL_{β_4}(2)		
.78		UL_l (1)	
.80		AuL_{β_3}(1)	
.84	PtL_l (1)		
.86	NiK_{β_1}(1), NbK_{α_2}(2)		ThL_{α_2}(1)
.88	IK_{β_2}(4), LaK_{α_2}(4)	RhK_{β_2}(2), CdK_{α_1}(3), AuL_{β_2}(1)	
.90		CeK_{α_1}(3)	
.92		HgL_{β_4}(1)	PbL_{β_3}(1)
.96	TmL_{β_3}(1)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
31.04	UL_{β_2}(2)		
.06	ThL_{β_3}(2)		
.08			AgK_{β_2}(2), PmK_{α_2}(3)
.14	ErL_{β_2}(1)	CdK_{α_2}(2), HgL_{β_6}(1)	
.16	TmL_{β_6}(1)		
.18			BiL_{β_4}(1)
.20	EuK_{α_2}(5)		
.28		AuL_{β_1}(1)	SeK_{β_2}(1)
.30	TaL_{α_1}(1), PrK_{β_1}(5)		
.32		CeK_{α_2}(3)	SnK_{α_1}(2)
.34	HfL_{η}(1)		
.36			PbL_{β_1}(1), PbL_{β_2}(1)
.38	PrK_{β_3}(5)		
.40			LaK_{β_1}(3)
.46			LaK_{β_3}(3)
.48	TbL_{γ_1}(1), ThL_{β_1}(2), TmL_{β_1}(1)	PaL_{γ}(1)	
.50	PdK_{β_2}(3)	RhK_{β_1}(2)	
.54	TaL_{α_2}(1)	RhK_{β_3}(2), PbL_{η}(1), SmK_{β_1}(4)	
.60	IK_{β_1}(4)		SnK_{α_2}(2)
.62	InK_{α_1}(3)	SmK_{β_3}(4)	IrL_{γ_1}(1)
.68	IK_{β_3}(4)		SeK_{β_1}(1)
.70	PaL_{β_4}(2), BaK_{α_1}(4)		BiL_{β_6}(1)
.72	CuK_{α_1}(1), CeK_{β_2}(5)	WL_{γ_1}(1)	
.74	SrK_{β_2}(2), EuK_{β_2}(6)		AgK_{β_1}(2)
.78	TmL_{β_4}(1), CuK_{α_2}(1)		AgK_{β_3}(2), NdK_{α_1}(3)
.80	SmK_{α_1}(5)		
.82		PtL_{β_2}(1)	
.86	PaL_{β_2}(2)		
.88		PtL_{β_3}(1)	BaK_{β_2}(3)
.90	InK_{α_2}(3)	SeK_{α_1}(1)	
.94			TlL_{β_3}(1)
.96		AuL_{β_4}(1)	
32.02		SeK_{α_2}(1)	
.08	BaK_{α_2}(4)	AuL_{β_6}(1)	
.12		LaK_{α_1}(3)	
.14	ErL_{β_3}(1)		
.16	PdK_{β_1}(3)		
.18	PdK_{β_3}(3)		PbL_{β_4}(1)
.20		ThL_{γ}(1)	
.22	TeK_{β_2}(4)		
.24	SrK_{β_1}(2)		NdK_{α_2}(3)
.26	HoL_{β_2}(1), ErL_{β_6}(1), SrK_{β_3}(2)	GeK_{β_2}(1)	TlL_{β_2}(1)
.30	SmK_{α_2}(5)		
.32	HfL_{α_1}(1)	AgK_{α_1}(2)	
.34		PtL_{β_1}(1)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
32.36	$ZrK_{\alpha_1}(2)$		
.42			$TlL_{\beta_1}(1)$
.44		$RuK_{\beta_2}(2)$	
.48	$UL_{\beta_6}(2)$, $LuL_{\eta}(1)$		
.52	$CeK_{\beta_1}(5)$	$LaK_{\alpha_2}(3)$	
.54	$HfL_{\alpha_2}(1)$, $ZrK_{\alpha_2}(2)$	$IK_{\beta_2}(3)$	
.58	$EuK_{\beta_1}(6)$	$AgK_{\alpha_2}(2)$, $TlL_{\eta}(1)$	
.60	$CeK_{\beta_3}(5)$	$PmK_{\beta_1}(4)$, $PmK_{\beta_3}(4)$	$PdK_{\beta_2}(2)$
.62		$GeK_{\beta_1}(1)$	$PbL_{\beta_6}(1)$
.66			$BaK_{\beta_1}(3)$
.68	$EuK_{\beta_3}(6)$, $ErL_{\beta_1}(1)$, $ThL_{\beta_2}(2)$, $ThL_{\beta_4}(2)$		
.72			$InK_{\alpha_1}(2)$
.74			$OsL_{\gamma_1}(1)$, $BaK_{\beta_3}(3)$
.78	$GdL_{\gamma_1}(1)$		
.80		$IrL_{\beta_2}(1)$	
.84			$EuK_{\beta_2}(4)$
.88		$TaL_{\gamma_1}(1)$	
.92	$SmK_{\beta_2}(6)$		
.96	$ErL_{\beta_4}(1)$		
.98	$TeK_{\beta_1}(4)$, $TeK_{\beta_3}(4)$	$IrL_{\beta_3}(1)$	
33.00	$CsK_{\alpha_1}(4)$, $LaK_{\beta_2}(5)$		$HgL_{\beta_3}(1)$, $PrK_{\alpha_1}(3)$
.02		$PtL_{\beta_4}(1)$	$InK_{\alpha_2}(2)$
.04	$PmK_{\alpha_1}(5)$	$PtL_{\beta_6}(1)$	
.06		$BiL_{\alpha_1}(1)$	
.08	$RhK_{\beta_2}(3)$, $CdK_{\alpha_1}(3)$		
.10		$RuK_{\beta_1}(2)$, $NdK_{\beta_2}(4)$	
.12		$RuK_{\beta_3}(2)$	
.16			$CsK_{\beta_2}(3)$
.18	$UL_{\eta}(2)$		
.22			$BrK_{\alpha_1}(1)$, $TlL_{\beta_4}(1)$
.24			$HgL_{\beta_2}(1)$
.28			$PdK_{\beta_1}(2)$
.30	$PaL_{\beta_6}(2)$	$IK_{\beta_1}(3)$	$PdK_{\beta_3}(2)$
.34	$CdK_{\alpha_2}(3)$		
.36	$LuL_{\alpha_1}(1)$	$IK_{\beta_3}(3)$	$BrK_{\alpha_2}(1)$
.38	$HoL_{\beta_3}(1)$, $CsK_{\alpha_2}(4)$		
.40	$CoK_{\beta_1}(1)$	$BiL_{\alpha_2}(1)$, $BaK_{\alpha_1}(3)$	$AsK_{\beta_2}(1)$
.44	$HoL_{\beta_6}(1)$		$PrK_{\alpha_2}(3)$
.46	$DyL_{\beta_2}(1)$		
.48	$PmK_{\alpha_2}(5)$	$IrL_{\beta_1}(1)$	
.52	$BiL_{\gamma_1}(2)$		$HgL_{\beta_1}(1)$
.56			$TlL_{\beta_6}(1)$
.60	$LuL_{\alpha_2}(1)$		
.62	$ReL_{l}(1)$		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
33.64	SbK_{β_2}(4)		
.66	RbK_{β_2}(2)	HgL_{η} (1)	
.70	YbL_{η}(1)		
.72			EuK_{β_1} (4)
.74	RhK_{β_1}(3)		
.78	SmK_{β_1}(6)		
.80	RhK_{β_3}(3), LaK_{β_1}(5)		AsK_{β_1} (1)
.82		BaK_{α_2}(3)	EuK_{β_2}(4)
.86			BiL_{η}(1)
.88	LaK_{β_3}(5), SmK_{β_3}(6)	PdK_{α_1}(2), OsL_{β_2}(1)	
.92			ReL_{γ_1} (1)
.94		TeK_{β_2}(3), NdK_{β_1}(4)	
.96	HoL_{β_1}(1)		
.98		PbL_{α_1}(1)	
34.00			CsK_{β_1}(3)
.02		AsK_{α_1}(1), NdK_{β_3}(4)	
.06			SmK_{β_2}(4)
.08		IrL_{β_6}(1)	CsK_{β_3}(3)
.10		HfL_{γ_1}(1)	
.12		IrL_{β_4}(1), PdK_{α_2}(2)	
.14		AsK_{α_2}(1)	UL_{γ} (1)
.16	ThL_{β_6}(2)	TcK_{β_2}(2)	AuL_{β_3}(1)
.18	EuK_{γ_1}(1), RbK_{β_1}(2), YK_{α_1}(2)		
.20	HoL_{β_4}(1), NiK_{α_1}(1), RbK_{β_3}(2)		
.22	PaL_{η}(2), NdK_{α_1}(5)		
.24			RhK_{β_2}(2), CdK_{α_1}(2), AuL_{β_2}(1)
.26			CeK_{α_1}(3)
.28	NiK_{α_2}(1)		HgL_{β_4}(1)
.32	BaK_{β_2}(5)		
.34		PbL_{α_2}(1)	
.36	YK_{α_2}(2)	PrK_{β_2}(4)	
.42	SbK_{β_1}(4), SbK_{β_3}(4)		
.48	YbL_{α_1}(1)		
.52			CdK_{α_2}(2), HgL_{β_6}(1)
.56		EuK_{α_1}(4)	
.62	WL_{γ}(1), AgK_{α_1}(3)	GaK_{β_2}(1)	
.64	PbL_{γ_1}(2)		
.66		OsL_{β_1}(1)	
.68	DyL_{β_3}(1), DyL_{β_6}(1)		AuL_{β_1}(1)
.72	NdK_{α_2}(5), TbL_{β_2}(1), YbL_{α_2}(1)		CeK_{α_2}(3)
.74		TeK_{β_1}(3), TeK_{β_3}(3)	
.78	RuK_{β_2}(3)	CsK_{α_1}(3)	
.82		TcK_{β_1}(2), AuL_{η}(1)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
34.90	AgK_{α_2}(3)		
.92			RhK_{β_1}(2), PaL_{ℓ}(1)
.94	PmK_{β_1}(6), PmK_{β_3}(6)	ReL_{β_2}(1)	
.96		GaK_{β_1}(1), TlL_{α_1}(1)	RhK_{β_3}(2), PbL_{η}(1), SmK_{β_1}(4)
35.00	TmL_{η}(1)		
.06			SmK_{β_3}(4)
.12		EuK_{α_2}(4)	
.16	SnK_{β_2}(4)		
.18	BaK_{β_1}(5)	CsK_{α_2}(3)	WL_{γ_1}(1)
.24	BaK_{β_3}(5)	PrK_{β_1}(4)	
.28	ThL_{η}(2)		PtL_{β_2}(1)
.30	DyL_{β_1}(1)	TlL_{α_2}(1)	
.32		PrK_{β_3}(4)	
.34		ReL_{β_3}(1)	
.36			PtL_{β_3}(1)
.38			SeK_{α_1}(1)
.42		LuL_{γ_1}(1)	
.44		SbK_{β_2}(3)	AuL_{β_4}(1)
.46	RuK_{β_1}(3)		
.50	RuK_{β_3}(3)		
.52	DyL_{β_4}(1)		SeK_{α_2}(1)
.54	PrK_{α_1}(5)	RhK_{α_1}(2)	
.58	NdK_{β_2}(6)		AuL_{β_6}(1)
.62		UL_{γ_1}(2)	LaK_{α_1}(3)
.66	SmL_{γ_1}(1), TmL_{α_1}(1)		
.70	TaL_{ℓ}(1)		
.72	CsK_{β_2}(5)	CeK_{β_2}(4)	ThL_{ℓ}(1)
.78		RhK_{α_2}(2)	GeK_{β_2}(1)
.80	IK_{α_1}(4)	SmK_{α_1}(4)	
.84	TlL_{γ_1}(2)		AgK_{α_1}(2)
.88	TmL_{α_2}(1)	ReL_{β_1}(1)	PtL_{β_1}(1)
.96	TbL_{β_6}(1), Sn K_{β_1}(4)	HgL_{α_1}(1)	
.98			RuK_{β_2}(2)
36.00		MoK_{β_2}(2)	
.02	SnK_{β_3}(4), PrK_{α_2}(5)	PtL_{η}(1)	
.06	GdL_{β_2}(1)	WL_{β_2}(1)	
.08	TbL_{β_3}(1)		LaK_{α_2}(3)
.10			IK_{β_2}(3)
.14			AgK_{α_2}(2), TlL_{η}(1)
.16	SrK_{α_1}(2)		PmK_{β_1}(4), PmK_{β_3}(4)
.18			GeK_{β_1}(1)
.20	IK_{α_2}(4)		
.26		ReL_{β_6}(1)	
.28		SbK_{β_1}(3), SbK_{β_3}(3)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
36.30	FeK_{β_1}(1), PdK_{α_1}(3)	HgL_{α_2}(1)	
.34	ErLn(1), SrK_{α_2}(2)	GeK_{α_1}(1)	
.36	NdK_{β_1}(6)		
.38		SmK_{α_2}(4)	IrL_{β_2}(1)
.46	NdK_{β_3}(6)	GeK_{α_2}(1)	
.48			TaL_{γ_1}(1)
.50		ReL_{β_4}(1)	
.58	PdK_{α_2}(3)		IrL_{β_3}(1)
.60		WL_{β_3}(1)	
.62	TcK_{β_2}(3), CsK_{β_1}(5)	CeK_{β_1}(4)	PtL_{β_4}(1)
.66			PtL_{β_6}(1)
.68		MoK_{β_1}(2)	BiL_{α_1}(1)
.70	CsK_{β_3}(5)	MoK_{β_3}(2)	
.72	TbL_{β_1}(1)	CeK_{β_3}(4)	RuK_{β_1}(2), NdK_{β_2}(4)
.74			RuK_{β_3}(2)
.76		YbL_{γ_1}(1), PaL_{γ_1}(2)	
.80	InK_{β_2}(4)		
.82	HfL_{ℓ}(1), PrK_{β_2}(6)		
.88	ErL_{α_1}(1)		
.90	TbL_{β_4}(1)		
.92	CeK_{α_1}(5)		IK_{β_1}(3)
37.00	CoK_{α_1}(1)		
.02		AuL_{α_1}(1)	IK_{β_3}(3)
.04	EuK_{α_1}(6)		
.06		SnK_{β_2}(3)	BiL_{α_2}(1), BaK_{α_1}(3)
.08	HgL_{γ_1}(2), CoK_{α_2}(1)		
.12	ErL_{α_2}(1)		
.14			IrL_{β_1}(1)
.16		LaK_{β_2}(4)	
.18		WL_{β_1}(1)	
.22		PmK_{α_1}(4)	
.24		ZnK_{β_2}(1)	
.26		TaL_{β_2}(1), IrLn(1)	
.28		EuK_{β_2}(5)	
.32	TcK_{β_1}(3)	RuK_{α_1}(2)	
.34	TeK_{α_1}(4)		HgLn (1)
.36		AuL_{α_2}(1)	
.38	GdL_{β_6}(1)		
.40	CeK_{α_2}(5)		
.42		WL_{β_6}(1)	
.48	EuL_{β_2}(1)		
.50			BaK_{α_2}(3)
.54	GdL_{β_3}(1)		
.56		RuK_{α_2}(2)	
.58			PdK_{α_1}(2), OsL_{β_2}(1)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
37.60		ZnK_{β_1}(1)	
.62	InK_{β_1}(4)		
.64	EuK_{α_2}(6)		NdK_{β_1}(4)
.66	InK_{β_3}(4)		TeK_{β_2}(3)
.68	UL_{α_1}(2)		
.70			PbL_{α_1}(1)
.72	TeK_{α_2}(4)	PmK_{α_2}(4)	
.74		IK_{α_1}(3)	AsK_{α_1}(1), NdK_{β_3}(4)
.78	HoL_n(1), PrK_{β_1}(6)	WL_{β_4}(1)	
.80			IrL_{β_6}(1)
.84			HfL_{γ_1}(1)
.86	PrK_{β_3}(6)		PdK_{α_2}(2), IrL_{β_4}(1)
.88			AsK_{α_2}(1)
.90		SnK_{β_1}(3)	TcK_{β_2}(2)
.92		ThL_{γ_1}(2)	
.94		TaL_{β_3}(1)	
.96		SnK_{β_3}(3)	
.98	LuL_l(1)	NbK_{β_2}(2)	
38.10	BrK_{β_2}(2), RhK_{α_1}(3)	LaK_{β_1}(4)	PbL_{α_2}(1)
.12		PtL_{α_1}(1)	PrK_{β_2}(4)
.14		IK_{α_2}(3)	
.18	HoL_{α_1}(1), UL_{γ_1}(3)	LaK_{β_3}(4)	
.20	UL_{α_2}(2)	TmL_{γ_1}(1)	
.22	GdL_{β_1}(1)		
.24		BiL_l(1)	
.28		EuK_{β_1}(5)	
.30	CeK_{β_2}(6)		
.32	RbK_{α_1}(2)		
.34			EuK_{α_1}(4)
.36	GdL_{β_4}(1), AuL_{γ_1}(2), RhK_{α_2}(3)		
.38	LaK_{α_1}(5), SmK_{α_1}(6)		
.40		EuK_{β_3}(5)	
.42			GaK_{β_2}(1)
.44	HoL_{α_2}(1)		OsL_{β_1}(1)
.46		PtL_{α_2}(1)	
.50	RbK_{α_2}(2)		
.52	CdK_{β_2}(4)	HfL_{β_2}(1)	
.54		TaL_{β_1}(1)	
.56		NdK_{α_1}(4)	TeK_{β_1}(3), TeK_{β_3}(3)
.58	MoK_{β_2}(3)		CsK_{α_1}(3)
.64	PaL_{α_1}(2), BrK_{β_1}(2)		TcK_{β_1}(2), AuL_n(1)
.66		BaK_{β_2}(4)	
.68		CbK_{β_1}(2), TaL_{β_6}(1), SmK_{β_2}(5)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
38.72		CbK_{β_3}(2)	
.76			ReL_{β_2}(1)
.80		InK_{β_2}(3)	GaK_{β_1}(1), TlL_{α_1}(1)
.82	EuL_{β_6}(1)		
.88	BiL_{β_3}(2), IK_{β_2}(5), LaK_{α_2}(5)		
.90	NdL_{γ_1}(1)		
.94		GaK_{α_1}(1)	
.98	SbK_{α_1}(4), SmK_{α_2}(6)		EuK_{α_2}(4)
39.00	SmL_{β_2}(1)		
.04			CsK_{α_2}(3)
.06		GaK_{α_2}(1)	
.08	EuL_{β_3}(1)		
.10			PrK_{β_1}(4)
.12		TaL_{β_4}(1), NdK_{α_2}(4)	
.14	PaL_{α_2}(2)		
.16			TlL_{α_2}(1)
.20			PrK_{β_3}(4)
.22		TcK_{α_1}(2)	ReL_{β_3}(1)
.24	YbL_{η}(1)	PbL_{η}(1)	
.26	CeK_{β_1}(6)		
.28		IrL_{α_1}(1)	
.30	DyL_{η}(1)		LuL_{γ_1}(1)
.32	MoK_{β_1}(3)	HfL_{β_3}(1)	
.34	MoK_{β_3}(3)		SbK_{β_2}(3)
.36	SbK_{α_2}(4), CeK_{β_3}(6)	TeK_{α_1}(3)	
.38	CdK_{β_1}(4)		
.42	PaL_{γ_1}(3)		RhK_{α_1}(2)
.44	CdK_{β_3}(4)		
.46	BiL_{β_1}(2)		
.50		TcK_{α_2}(2)	
.54			UL_{γ_1}(2)
.56	DyL_{α_1}(1)		
.60	BiL_{β_2}(2), MnK_{β_1}(1)		
.62	ThL_{α_1}(2)	IrL_{α_2}(1)	
.64		BaK_{β_1}(4)	CeK_{β_2}(4)
.66		InK_{β_1}(3)	
.70		InK_{β_3}(3), ErL_{γ_1}(1)	
		SmK_{β_1}(5)	
.72	PtL_{γ_1}(2)	BaK_{β_3}(4)	RhK_{α_2}(2)
.74			SmK_{α_1}(4)
.78		TeK_{α_2}(3)	
.80	DyL_{α_2}(1), IK_{β_1}(5)		
.82	EuL_{β_1}(1)	SmK_{β_3}(5)	
.84	LaK_{β_2}(6)		ReL_{β_1}(1)
.86		LuL_{β_2}(1)	
.88	IK_{β_3}(5)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
39.90	$PmK\alpha_1$(6)		
.92	$BaK\alpha_1$(5)		$HgL\alpha_1$(1)
.94	$EuL\beta_4$(1)		$MoK\beta_2$(2)
.96		$HfL\beta_1$(1), $HfL\beta_6$(1)	
		$ReL\eta$(1)	
.98			$PtL\eta$(1)
40.02	$RuK\alpha_1$(3)		
.04		$PrK\alpha_1$(4)	$WL\beta_2$(1)
.14	$ThL\alpha_2$(2)	$ZrK\beta_2$(2)	
.16	$FeK\alpha_1$(1)		
.18		$CuK\beta_2$(1)	
.22	$PbL\beta_3$(2)		
.24	$FeK\alpha_2$(1)		$ReL\beta_6$(1)
.26		$CsK\beta_2$(4)	$SbK\beta_1$(3), $SbK\beta_3$(3)
.28			$HgL\alpha_2$(1)
.30	$RuK\alpha_2$(3)	$TlL\gamma$(1)	
.34			$GeK\alpha_1$(1)
.36			$SmK\alpha_2$(4)
.38	$SmL\beta_6$(1)		
.42	$AgK\beta_2$(4), $BaK\alpha_2$(5)		
.44	$PmK\alpha_2$(6)		
.48			$GeK\alpha_2$(1)
.50		$OsL\alpha_1$(1)	
.52		$HfL\beta_4$(1), $CuK\beta_1$(1)	$ReL\beta_4$(1)
.54	$BiL\beta_4$(2)		
.56	$TmL\gamma$(1)		
.58	$TeK\beta_2$(5)		
.60		$PrK\alpha_2$(4)	
.62		$CdK\beta_2$(3)	
.64			$WL\beta_3$(1)
.66	$ThL\gamma_1$(3)		$CeK\beta_1$(4)
.68	$SeK\beta_2$(2)		
.70	$PrL\gamma_1$(1)		$MoK\beta_1$(2)
.72	$SmL\beta_3$(1)		
.74	$SnK\alpha_1$(4), $NbK\beta_2$(3)		$MoK\beta_3$(2)
.76			$CeK\beta_3$(4)
.80	$PbL\beta_1$(2), $PbL\beta_2$(2)	$LuL\beta_3$(1), $OsL\alpha_2$(1)	$YbL\gamma_1$(1), $PaL\gamma_1$(2)
.84	$LaK\beta_1$(6)		
.86		$ZrK\beta_1$(2)	
.90		$ZrK\beta_3$(2)	
.94	$LaK\beta_3$(6)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
41.02	$TbL\alpha_1$(1)		
.08		$PmK\beta_1$(5), $PmK\beta_3$(5)	
.10		$SbK\alpha_1$(3)	$AuL\alpha_1$(1)
.12	$SnK\alpha_2$(4)		
.14	$IrL\gamma_1$(2)		$SnK\beta_2$ (3)
.20	$SeK\beta_1$(2)		
.24	$TbL\alpha_2$(1)	$YbL\beta_2$(1)	
.26	$BiL\beta_6$(2)		$LaK\beta_2$(4)
.28	$AgK\beta_1$(4)	$CsK\beta_1$(4), $HoL\gamma_1$(1), $LuL\beta_6$(1)	$WL\beta_1$(1)
.32		$MoK\alpha_1$(2)	$PmK\alpha_1$(4)
.34	$AgK\beta_3$(4), $NdK\alpha_1$(6)		
.36			$ZnK\beta_2$(1)
.38		$CsK\beta_3$(4), $UL\beta_3$(2)	$TaL\beta_2$(1), $IrL\eta$(1), $EuK\beta_2$(5)
.40		$WL\eta$(1)	
.42		$HgL\zeta$(1)	
.44			$RuK\alpha_1$(2)
.46	$BaK\beta_2$(6)		
.48	$CbK\beta_1$(3)	$LuL\beta_1$(1)	$AuL\alpha_2$(1)
.50	$SmL\beta_1$(1)	$SbK\alpha_2$(3)	
.52	$NbK\beta_3$(3)	$CdK\beta_1$(3)	
.54			$WL\beta_6$(1)
.56	$SmL\beta_4$(1), $TlL\beta_3$(2), $TeK\beta_1$(5), $TeK\beta_3$(5)		
.58		$CdK\beta_3$(3)	
.60	$CsK\alpha_1$(5)		
.62		$MoK\alpha_2$(2), $CeK\alpha_1$(4)	
.72		$NdK\beta_2$(5)	$RuK\alpha_2$(2)
.74			$ZnK\beta_1$(1)
.76		$ReL\alpha_1$(1)	
.84		$ZnK\alpha_1$(1)	
.88	$PbL\beta_4$(2)		$PmK\alpha_2$(4)
.90			$IK\alpha_1$(3)
.94		$ZnK\alpha_2$(1)	$WL\beta_4$(1)
.96	$ErL\zeta$(1), $NdK\alpha_2$(6)		
.98		$LuL\beta_4$(1), $UL\beta_1$(2)	
42.00	$TlL\beta_2$(2)		
.06	$TcK\alpha_1$(3)		
.08	$CsK\alpha_2$(5)		
.10		$ReL\alpha_2$(1)	$SnK\beta_1$(3), $ThL\gamma_1$(2)
.12			$TaL\beta_3$(1)
.16			$SnK\beta_3$(3)
.18		$CeK\alpha_2$(4)	$CbK\beta_2$(2)
.20	$TlL\beta_1$(2)		
.30			$LaK\beta_1$(4)
.32	$NdL\beta_2$(1)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
42.34			PtL_{α_1}(1)
.36	TcK_{α_2}(3)	YbL_{β_3}(1)	IK_{α_2}(3)
.40			LaK_{β_3}(4)
.42	SbK_{β_2}(5)		TmL_{γ_1}(1)
.44	PdK_{β_2}(4)		BiL_{ℓ}(1)
.46	PbL_{β_6}(2)		
.50		YK_{β_2}(2)	EuK_{β_1}(5)
.52	BaK_{β_1}(6)		
.54	GdL_{α_1}(1)		
.58		AuL_{ℓ}(1)	
.60	BaK_{β_3}(6), CeL_{γ_1}(1), InK_{α_1}(4)		
.62	GdL_{η} (1)	AgK_{β_2}(3)	
.64	OsL_{γ_1}(2)		EuK_{β_3}(5)
.68		TmL_{β_2}(1)	
.72		PaL_{β_3}(2)	PtL_{α_2}(1)
.76		YbL_{β_6}(1)	
.78	GdL_{α_2}(1)	NdK_{β_1}(5)	HfL_{β_2}(1)
.80			TaL_{β_1}(1)
.82			NdK_{α_1}(4)
.90		NdK_{β_3}(5)	
.92		TaL_{η} (1)	
.94			BaK_{β_2}(4)
.96	HgL_{β_3}(2), PrK_{α_1}(6)	SnK_{α_1}(3)	CbK_{β_1}(2), TaL_{β_6}(1), SmK_{β_2}(5)
.98	InK_{α_2}(4)	DyL_{γ_1}(1)	
43.00			CbK_{β_3}(2)
.06	ZrK_{β_2}(3)	YbL_{β_1}(1)	
.08		WL_{α_1}(1)	InK_{β_2}(3)
.18	CsK_{β_2}(6)		
.24	TlL_{β_4}(2)	YK_{β_1}(2)	GaK_{α_1}(1)
.28	HgL_{β_2}(2), BrK_{α_1}(2)	YK_{β_3}(2)	
.30		LaK_{α_1}(4)	
.34	PdK_{β_1}(4)	PaL_{β_1}(2), PrK_{β_2}(5)	
.36		SnK_{α_2}(3)	
.38	PdK_{β_3}(4)		GaK_{α_2}(1)
.40	CrK_{β_1}(1)		
.42	HoL_{ℓ}(1), SbK_{β_1}(5), SbK_{β_3}(5)		
.44		WL_{α_2}(1)	TaL_{β_4}(1), NdK_{α_2}(4)
.46	BrK_{α_2}(2)	$^{a}NiK_{\beta_2}$(1)	
.50	AsK_{β_2}(2)		
.54		AgK_{β_1}(3), YbL_{β_4}(1)	
.56	PrK_{α_2}(6)		TcK_{α_1}(2)
.58		CbK_{α_1}(2), EuK_{α_1}(5)	
.60		AgK_{β_3}(3)	PbL_{ℓ}(1)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
43.64			IrL_{α_1}(1)
.66	HgL_{β_1}(2)		
.68		UL_{β_4}(2)	HfL_{β_3}(1)
.70	TlL_{β_6}(2)		
.72			TeK_{α_1}(3)
.76	MnK_{α_1}(1)		
.80	NdL_{β_6}(1)	PtL_{γ}(1)	
.82		NiK_{β_1}(1)	
.84	ZrK_{β_1}(3)	CbK_{α_2}(2)	
.86	MnK_{α_2}(1)	LaK_{α_2}(4)	TcK_{α_2}(2)
.88	ZrK_{β_3}(3)	IK_{β_2}(4)	
.98		TmL_{β_3}(1)	
44.02			IrL_{α_2}(1)
.04	AsK_{β_1}(2)		BaK_{β_1}(4)
.06			InK_{β_1}(3)
.10	BiL_{η} (2)	ThL_{β_3}(2), UL_{β_2}(2)	ErL_{γ_1}(1), SmK_{β_1}(5)
.12			InK_{β_3}(3)
.14	PrL_{β_2}(1)		BaK_{β_3}(4)
.18	EuL_{α_1}(1)		TeK_{α_2}(3)
.20	ReL_{γ_1}(2)		
.24		ErL_{β_2}(1)	SmK_{β_3}(5)
.26		TmL_{β_6}(1)	LuL_{β_2}(1)
.30	NdL_{β_3}(1), CsK_{β_1}(6)		
.32		EuK_{α_2}(5)	
.34	MoK_{α_1}(3)		
.36	SnK_{β_2}(5)		
.38			ReL_{η} (1)
.40	UL_{β_3}(3), CsK_{β_3}(6)		HfL_{β_1}(1), HfL_{β_6}(1)
.42	EuL_{α_2}(1)		
.48	UL_{γ}(2)	PrK_{β_1}(5)	
.50	AuL_{β_3}(2)	TaL_{α_1}(1)	PrK_{α_1}(4)
.52		HfL_{η} (1)	
.58		PrK_{β_3}(5)	
.60	AuL_{β_2}(2), RhK_{β_2}(4), CdK_{α_1}(4)		ZrK_{β_2}(2)
.64	LaL_{γ_1}(1)		CuK_{β_2}(1)
.66	CeK_{α_1}(6), HgL_{β_4}(2), MoK_{α_2}(3)		
.74		TbL_{γ_1}(1), TmL_{β_1}(1) ThL_{β_1}(2)	CsK_{β_2}(4)
.76		PdK_{β_2}(3)	
.78			TlL_{γ} (1)
.84		TaL_{α_2}(1)	
.92		IK_{β_1}(4)	
.94		InK_{α_1}(3)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
45.00	$HgL_{\beta_6}(2)$, $CdK_{\alpha_2}(4)$		$OsL_{\alpha_1}(1)$
.02	$DyL_{l}(1)$	$IK_{\beta_3}(4)$	$CuK_{\beta_1}(1)$, $HfL_{\beta_4}(1)$
.04	$UL_{\beta_1}(3)$	$PaL_{\beta_4}(2)$	
.06		$CuK_{\alpha_1}(1)$, $BaK_{\alpha_1}(4)$	
.10		$SrK_{\beta_2}(2)$, $CeK_{\beta_2}(5)$	
		$EuK_{\beta_2}(6)$	
.12			$CdK_{\beta_2}(3)$, $PrK_{\alpha_2}(4)$
.18	$NdL_{\beta_4}(1)$, $NdL_{\beta_1}(1)$	$TmL_{\beta_4}(1)$, $CuK_{\alpha_2}(1)$	
.20	$AuL_{\beta_1}(2)$, $IK_{\alpha_1}(5)$	$SmK_{\alpha_1}(5)$	
.26	$CeK_{\alpha_2}(6)$		
.28		$PaL_{\beta_2}(2)$	
.32			$LuL_{\beta_3}(1)$
.34		$InK_{\alpha_2}(3)$	$OsL_{\alpha_2}(1)$
.40	$SnK_{\beta_1}(5)$		
.42			$ZrK_{\beta_1}(2)$
.44			$ZrK_{\beta_3}(2)$
.46	$SnK_{\beta_3}(5)$		
.52	$PaL_{l}(2)$		
.54	$RhK_{\beta_1}(4)$		
.58	$PbL_{\eta}(2)$, $RhK_{\beta_3}(4)$		
.62	$YK_{\beta_2}(3)$	$BaK_{\alpha_2}(4)$	
.66			$SbK_{\alpha_1}(2)$, $PmK_{\beta_1}(5)$, $PmK_{\beta_3}(5)$
.70	$PrL_{\beta_6}(1)$, $IK_{\alpha_2}(5)$	$ErL_{\beta_3}(1)$,	
.72		$PdK_{\beta_1}(3)$	
.76		$PdK_{\beta_3}(3)$	
.82		$TeK_{\beta_2}(4)$	$YbL_{\beta_2}(1)$
.84		$SrK_{\beta_1}(2)$	
.86	$PaL_{\beta_3}(3)$, $WL_{\gamma_1}(2)$		
.88		$SrK_{\beta_3}(2)$, $HoL_{\beta_2}(1)$	$CsK_{\beta_1}(4)$, $HoL_{\gamma_1}(1)$,
		$ErL_{\beta_6}(1)$	$LuL_{\beta_6}(1)$
.92	$SmL_{\alpha_1}(1)$	$SmK_{\alpha_2}(5)$	
.94			$MoK_{\alpha_1}(2)$
.96		$HfL_{\alpha_1}(1)$	
.98			$CsK_{\beta_3}(4)$, $UL_{\beta_3}(2)$
46.00			$WL_{\eta}(1)$
.02	$PtL_{\beta_2}(2)$		$HgL_{l}(1)$
.04		$ZrK_{\alpha_1}(2)$	
.10	$PtL_{\beta_3}(2)$		$LuL_{\beta_1}(1)$
.12	$CeL_{\beta_2}(1)$		$SbK_{\alpha_2}(3)$
.14	$SmL_{\alpha_2}(1)$, $SeK_{\alpha_1}(2)$		$CdK_{\beta_1}(3)$
.18		$UL_{\beta_6}(2)$	
.20	$AuL_{\beta_4}(2)$	$LuL_{\eta}(1)$	
.22			$CdK_{\beta_3}(3)$
.26		$CeK_{\beta_1}(5)$	$MoK_{\alpha_2}(2)$, $CeK_{\alpha_1}(4)$

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
46.30	PrL_{β_3}(1), SeK_{α_2}(2)	ZrK_{α_2}(2), HfL_{α_2}(1)	
.32	SmL_{η} (1)		
.34		EuK_{β_1}(6)	
.36		CeK_{β_3}(5)	
.38			NdK_{β_2}(5)
.40	AuL_{β_6}(2), YK_{β_1}(3)		
.42			ReL_{α_1}(1)
.44	YK_{β_3}(3)		
.46	LaK_{α_1}(6)		
.48	InK_{β_2}(5)	EuK_{β_3}(6)	
.50		ErL_{β_1}(1)	ZnK_{α_1}(1)
.52	PaL_{β_1}(3)	ThL_{β_2}(2), ThL_{β_4}(2)	
.58	ThL_{l}(2)		
.62			ZnK_{α_2}(1)
.66	TbL_{l}(1), GeK_{β_2}(2)	GdL_{γ_1}(1)	LuL_{β_4}(1), UL_{β_1}(2)
.76	AgK_{α_1}(4)		
.78	NbK_{α_1}(3)		
.80	PtL_{β_1}(2)		ReL_{α_2}(1)
.84	BaL_{γ_1}(1)	SmK_{β_2}(6)	
.88	UL_{β_4}(3)		CeK_{α_2}(4)
.90		ErL_{β_4}(1)	
.92		TeK_{β_1}(4), TeK_{β_3}(4)	
.94	RuK_{β_2}(4)	LaK_{β_2}(5)	
.96		CsK_{α_1}(4)	
47.02		PmK_{α_1}(5)	
.06	CbK_{α_2}(3), LaK_{α_2}(6)	RhK_{β_2}(3), CdK_{α_1}(3)	
.08			YbL_{β_3}(1)
.10	IK_{β_2}(6)		
.12	PrL_{β_4}(1)		
.14	AgK_{α_2}(4)		
.16	TlL_{η} (2)		
.18	TeK_{α_1}(5)		
.20	GeK_{β_1}(2)		
.22	PrL_{β_1}(1)	UL_{η} (2)	
.26			YK_{β_2}(2)
.34	ThL_{β_3}(3), UL_{β_2}(3)		AuL_{l} (1)
.38			AgK_{β_2}(3)
.40		PaL_{β_6}(2)	
.46			TmL_{β_2}(1)
.48	IrL_{β_2}(2)	CdK_{α_2}(3)	
.50		LuL_{α_1}(1), HoL_{β_3}(1)	PaL_{β_3}(2)
.52		CsK_{α_2}(4)	
.54	InK_{β_1}(5)		YbL_{β_6}(1)
.56		CoK_{β_1}(1)	NdK_{β_1}(5)
.60	TaL_{γ_1}(2), InK_{β_3}(5)	HoL_{β_6}(1)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
47.62		DyL_{β_2}(1)	
.66	TeK_{α_2}(5)	PmK_{α_2}(5)	
.70			NdK_{β_3}(5)
.72	CeL_{β_6}(1), IrL_{β_3}(2)	BiL_{γ_1}(2)	TaL_{η} (1)
.76			SnK_{α_1}(3)
.78			DyL_{γ_1}(1)
.80	PtL_{β_4}(2), VK_{β_1}(1)		
.82		LuL_{α_2}(1)	
.84	PtL_{β_6}(2)		
.86	BiL_{α_1}(2)	ReL_{l}(1)	
.88			YbL_{β_1}(1)
.90		SbK_{β_2}(4)	
.92	CrK_{α_1}(1), RuK_{β_1}(4)	RbK_{β_2}(2)	WL_{α_1}(1)
.98	RuK_{β_3}(4)	YbL_{η} (1)	
48.00	CrK_{α_2}(1)		
.04	ThL_{β_1}(3)		
.06		RhK_{β_1}(3)	
.08			YK_{β_1}(2)
.10		SmK_{β_1}(6)	
.12		RhK_{β_3}(3)	YK_{β_3}(2)
.14			LaK_{α_1}(4)
.16		LaK_{β_1}(5)	
.20	LaL_{β_2}(1), IK_{β_1}(6)		PaL_{β_1}(2), PrK_{β_2}(5)
.22			SnK_{α_2}(3)
.24		SmK_{β_3}(6)	
.26		LaK_{β_3}(5)	
.30			WL_{α_2}(1)
.32	IK_{β_3}(6)		
.34			NiK_{β_2}(1)
.36	PaL_{β_4}(3)	HoL_{β_1}(1)	
.38	CeL_{β_3}(1), BiL_{α_2}(2), BaK_{α_1}(6)		
.40	GdL_{l}(1)		
.42	SrK_{β_2}(3)		AgK_{β_1}(3), YbL_{β_4}(1)
.48	IrL_{β_1}(2)		CbK_{α_1}(2), AgK_{β_3}(3), EuK_{α_1}(5)
.58			UL_{β_4}(2)
.60	PaL_{β_2}(3)		
.66		ThL_{β_6}(2)	
.70		RbK_{β_1}(2), YK_{α_1}(2), EuL_{γ_1}(1)	PtL_{l}(1)
.72	CdK_{β_2}(5)	RbK_{β_3}(2), NiK_{α_1}(1)	
.74		HoL_{β_4}(1), PaL_{η} (2)	NiK_{β_1}(1)
.76	HgL_{η} (2)	NdK_{α_1}(5)	CbK_{α_2}(2), LaK_{α_2}(4)
.80			IK_{β_2}(4)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
48.84		$NiK\alpha_2$(1)	
.90		$BaK\beta_2$(5)	
.92			$TmL\beta_3$(1)
.96		$YK\alpha_2$(2)	
.98	$BaK\alpha_2$(6)		
49.04		$SbK\beta_1$(4), $SbK\beta_3$(4)	
.06			$ThL\beta_3$(2), $UL\beta_2$(2)
.08	$OsL\beta_2$(2), $PdK\alpha_1$(4)		
.14		$YbL\alpha_1$(1)	
.20	$CsL\gamma_1$(1), $TeK\beta_2$(6)		$ErL\beta_2$(1)
.24	$CeL\beta_4$(1), $PbL\alpha_1$(2), $SrK\beta_1$(3)		$TmL\beta_6$(1)
.26	$SrK\beta_3$(3)		
.30	$AsK\alpha_1$(2), $SbK\alpha_1$(5)		$EuK\alpha_2$(5)
.34		$AgK\alpha_1$(3)	
.36		$WL\ell$(1)	
.38	$CeL\beta_1$(1), $IrL\beta_6$(2)	$PbL\gamma_1$(2)	
.42	$HfL\gamma_1$(2)		
.44	$ZrK\alpha_1$(3)	$DyL\beta_3$(1), $DyL\beta_6$(1)	
.46	$IrL\beta_4$(2), $AsK\alpha_2$(2), $PdK\alpha_2$(4)		$PrK\beta_1$(5)
.48		$TbL\beta_2$(1), $YbL\alpha_2$(1)	
		$NdK\alpha_2$(5)	$TaL\alpha_1$(1)
.52	$TcK\beta_2$(4)		$HfL\eta$(1)
.56		$RuK\beta_2$(3)	
.58			$PrK\beta_3$(5)
.60	$UL\beta_6$(3)		
.70	$NdL\alpha_1$(1)		
.72	$ZrK\alpha_2$(3)		
.76	$PbL\alpha_2$(2)	$AgK\alpha_2$(3)	$TbL\gamma_1$(1), $TmL\beta_1$(1)
.78			$ThL\beta_1$(2)
.80	$SbK\alpha_2$(5), $CdK\beta_1$(5)	$PmK\beta_1$(6), $PmK\beta_3$(6)	$PdK\beta_2$(3)
.86			$TaL\alpha_2$(1)
.90	$LaL\beta_6$(1), $CdK\beta_3$(5)	$TmL\eta$(1)	
.94	$NdL\alpha_2$(1), $ThL\beta_2$(3), $ThL\beta_4$(3)		
.96			$IK\beta_1$(4)
.98			$InK\alpha_1$(3)
50.08			$IK\beta_3$(4)
.10			$PaL\beta_4$(2)
.14		$SnK\beta_2$(4)	$CuK\alpha_1$(1), $BaK\alpha_1$(4)
.16		$BaK\beta_1$(5)	$CeK\beta_2$(5)
.18			$SrK\beta_2$(2), $EuK\beta_2$(6)
.20	$GaK\beta_2$(2)		
.26	$EuL\ell$(1), $OsL\beta_1$(2)	$BaK\beta_3$(5)	$CuK\alpha_2$(1), $TmL\beta_4$(1)
.28			$SmK\alpha_1$(5)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
50.32		ThL_{η} (2)	
.36		DyL_{β_1} (1)	PaL_{β_2}(2)
.40	TeK_{β_1}(6), TeK_{β_3}(6)		
.42	CsK_{α_1}(6)		
.46	BaL_{β_2}(1)		InK_{α_2}(3)
.50	AuL_{η} (2), TcK_{β_1} (4)		
.58	NdL_{η} (1)	RuK_{β_1}(3)	
.60	LaL_{β_3}(1)	NdK_{β_2}(6)	
.64		RuK_{β_3}(3)	
.66	ReL_{β_2}(2)		
.68		DyL_{β_4}(1), PrK_{α_1}(5)	
.70	TlL_{α_1}(2), GaK_{β_1}(2)		
.72	UL_{η} (3)		
.76			BaK_{α_2}(4)
.84			ErL_{β_3}(1)
.86		TmL_{α_1}(1)	
.88		SmL_{γ_1}(1)	PdK_{β_1}(3)
.90	PaL_{β_6}(3)		
.92			PdK_{β_3}(3)
.94		TaL_{ℓ}(1)	
.96		CsK_{β_2}(5)	
.98			TeK_{β_2}(4)
51.02			SrK_{β_1}(2)
.04	CsK_{α_2}(6)		
.06			SrK_{β_3}(2), HoL_{β_2}(1), ErL_{β_6}(1)
.10		IK_{α_1}(4)	SmK_{α_2}(5)
.14		TlL_{γ_1}(2)	HfL_{α_1}(1)
.16	AgK_{β_2}(5)		
.22	TlL_{α_2}(2)	TmL_{α_2}(1)	ZrK_{α_1}(2)
.24	BiL_{γ_1}(3)		
.28	ReL_{β_3}(2)		
.32		SnK_{β_1}(4), TbL_{β_6}(1)	
.40	LuL_{γ_1}(2)	SnK_{β_3}(4)	LuL_{η} (1), UL_{β_6}(2)
.42		PrK_{α_2}(5)	
.44	SbK_{β_2}(6)		
.46		GdL_{β_2}(1)	
.48	LaL_{β_4}(1), RbK_{β_2}(3)	TbL_{β_3}(1)	CeK_{β_1}(5)
.52			ZrK_{α_2}(2), HfL_{α_2}(1)
.56			EuK_{β_1}(6)
.58	SnK_{α_1}(5), RhK_{α_1}(4)		
.60			CeK_{β_3}(5)
.62		SrK_{α_1}(2)	
.66		IK_{α_2}(4)	
.68	LaL_{β_1}(1)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
51.72	$UL\gamma_1$(4)		
.74			$ErL\beta_1$(1), $EuK\beta_3$(6)
.76			$ThL\beta_2$(2), $ThL\beta_4$(2)
.78	$PrL\alpha_1$(1)		
.82		$FeK\beta_1$(1), $PdK\alpha_1$(3)	
.88		$ErL\eta$ (1)	
.90		$SrK\alpha_2$(2)	
.92		$NdK\beta_1$(6)	$GdL\gamma_1$(1)
.96	$RhK\alpha_2$(4)		
52.02	$PrL\alpha_2$(1)		
.06		$NdK\beta_3$(6)	
.08	$SnK\alpha_2$(5)		
.12	$ReL\beta_1$(2)		
.14			$SmK\beta_2$(6)
.20			$ErL\beta_4$(1)
.22	SmL_l (1)	$PdK\alpha_2$(3)	
.24	$BaL\beta_6$(1), $HgL\alpha_1$(2)		$TeK\beta_1$(4), $TeK\beta_3$(4)
.26	$MoK\beta_2$(4)		$LaK\beta_2$(5)
.28	$ThL\beta_6$(3)	$TcK\beta_2$(3)	$CsK\alpha_1$(4)
.30	$PtL\eta$ (2), $AgK\beta_1$(5)	$CsK\beta_1$(5)	
.32	$RbK\beta_1$(3), $YK\alpha_1$(3)		
.34			$PmK\alpha_1$(5)
.36	$RbK\beta_3$(3)		
.38	$PaL\eta$(3), $WL\beta_2$(2), $AgK\beta_3$(5)		$RhK\beta_2$(3), $CdK\alpha_1$(3)
.42		$CsK\beta_3$(5)	
.44		$TbL\beta_1$(1)	
.56		$InK\beta_2$(4)	$UL\eta$ (2)
.60	$YK\alpha_2$(3)	HfL_l(1), $PrK\beta_2$(6)	
.66	$ReL\beta_6$(2)		
.70	$VK\alpha_1$(1), $SbK\beta_1$(6), $SbK\beta_3$(6)	$ErL\alpha_1$(1)	
.72	$HgL\alpha_2$(2)	$TbL\beta_4$(1)	
.74		$CeK\alpha_1$(5)	
.76			$PaL\beta_6$(2)
.80	$VK\alpha_2$(1), $GeK\alpha_1$(2)		
.84		$CoK\alpha_1$(1)	$CdK\alpha_2$(3)
.88			$LuL\alpha_1$(1)
.90	$PrL\eta$ (1), $CsL\beta_2$(1)		$CsK\alpha_2$(4), $HoL\beta_3$(1)
.92		$EuK\alpha_1$(6)	
.94			$CoK\beta_1$(1)
.96	$TiK\beta_1$(1)		
.98	$GeK\alpha_2$(2)	$HgL\gamma_1$(2), $CoK\alpha_2$(1)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
53.00	BaL_{β_3}(1)		HoL_{β_6}(1)
.02			DyL_{β_2}(1)
.04	ReL_{β_4}(2)	ErL_{α_2}(1)	
.06	PbL_{γ_1}(3)		PmK_{α_2}(5)
.12			BiL_{γ_1}(2)
.20	WL_{β_3}(2)		
.26			LuL_{α_2}(1)
.30	MoK_{β_1}(4)		ReL_l(1)
.32			SbK_{β_2}(4)
.34	MoK_{β_3}(4)	TcK_{β_1}(3)	
.36		TeK_{α_1}(4)	
.38			RbK_{β_2}(2)
.42	YbL_{γ_1}(2)	GdL_{β_6}(1)	YbL_η(1)
.44	PaL_{γ_1}(4)		
.48		CeK_{α_2}(5)	
.52			RhK_{β_1}(3)
.56			SmK_{β_1}(6)
.58		EuL_{β_2}(1)	RhK_{β_3}(3)
.62			LaK_{β_1}(5)
.66		GdL_{β_3}(1)	
.72			SmK_{β_3}(6)
.74			LaK_{β_3}(5)
.78		InK_{β_1}(4)	
.80	PdK_{β_2}(5)		
.82	AuL_{α_1}(2)	EuK_{α_2}(6)	
.86		InK_{β_3}(4)	HoL_{β_1}(1)
.88	BaL_{β_4}(1), SnK_{β_2}(6)	UL_{α_1}(2)	
.94		TeK_{α_2}(4)	
54.00	InK_{α_1}(5)		
.02	CeL_{α_1}(1)	HoL_η(1), PrK_{β_1}(6)	
.08	ThL_η(3), WL_{β_1}(2)		
.14		PrK_{β_3}(6)	
.16	BaL_{β_1}(1), ZnK_{β_2}(2)		
.20	TaL_{β_2}(2), IrL_η(2)		ThL_{β_6}(2)
.22	CeL_{α_2}(1)		
.24			RbK_{β_1}(2), YK_{α_1}(2), EuL_{γ_1}(1)
.26			NiK_{α_1}(1)
.28	RuK_{α_1}(4)		RbK_{β_3}(2), HoL_{β_4}(1)
.30			PaL_η(2), NdK_{α_1}(5)
.34	AuL_{α_2}(2)	LuL_l(1)	
.40			NiK_{α_2}(1)
.44	WL_{β_6}(2)		
.46			BaK_{β_2}(5)
.48		RhK_{α_1}(3)	
.50	InK_{α_2}(5)	BrK_{β_2}(2)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
54.52	$IL_{\gamma_1}(1)$		
.54			$YK_{\alpha_2}(2)$
.62		$UL_{\gamma_1}(3)$	
.64		$HoL_{\alpha_1}(1)$, $UL_{\alpha_2}(2)$	$SbK_{\beta_1}(4)$, $SbK_{\beta_3}(4)$
.68	$RuK_{\alpha_2}(4)$	$GdL_{\beta_1}(1)$	
.70	$ZnK_{\beta_1}(2)$		
.72			$YbL_{\alpha_1}(1)$
.74	$CsL_{\beta_6}(1)$		
.78		$CeK_{\beta_2}(6)$	
.84		$RbK_{\alpha_1}(2)$	
.88		$RhK_{\alpha_2}(3)$	
.90		$GdL_{\beta_4}(1)$, $AuL_{\gamma_1}(2)$	
.92	$IK_{\alpha_1}(6)$	$LaK_{\alpha_1}(5)$, $SmK_{\alpha_1}(6)$	
.96	$TlL_{\gamma_1}(3)$		
.98	$WL_{\beta_4}(2)$, $PdK_{\beta_1}(5)$	$HoL_{\alpha_2}(1)$	$AgK_{\alpha_1}(3)$, $WL_{\ell}(1)$
55.02			$PbL_{\gamma_1}(2)$
.04	$PdK_{\beta_3}(5)$		
.08			$DyL_{\beta_3}(1)$, $DyL_{\beta_6}(1)$
.10		$RbK_{\alpha_2}(2)$	
.12			$TbL_{\beta_2}(1)$, $YbL_{\alpha_2}(1)$, $NdK_{\alpha_2}(5)$
.14		$CdK_{\beta_2}(4)$	
.16	$SnK_{\beta_1}(6)$		
.18	$ThL_{\gamma_1}(4)$		
.22	$TaL_{\beta_3}(2)$	$MoK_{\beta_2}(3)$	$RuK_{\beta_2}(3)$
.26	$SnK_{\beta_3}(6)$		
.30	$NbK_{\beta_2}(4)$	$BrK_{\beta_1}(2)$, $PaL_{\alpha_1}(2)$	
.38	$CeL_{\eta}(1)$		
.44			$AgK_{\alpha_2}(3)$
.48			$PmK_{\beta_1}(6)$, $PmK_{\beta_3}(6)$
.50	$PtL_{\alpha_1}(2)$, $SrK_{\alpha_1}(3)$		
.54	$IK_{\alpha_2}(6)$		
.56	$CsL_{\beta_3}(1)$		
.58		$EuL_{\beta_6}(1)$	
.60			$TmL_{\eta}(1)$
.62	$TmL_{\gamma_1}(2)$		
.64		$LaK_{\alpha_2}(5)$	
.66	$BiL_{\ell}(2)$		
.68		$NdL_{\gamma_1}(1)$, $BiL_{\beta_3}(2)$, $IK_{\beta_2}(5)$	
.78	$SrK_{\alpha_2}(3)$		
.80		$SbK_{\alpha_1}(4)$	
.82		$SmL_{\beta_2}(1)$, $SmK_{\alpha_2}(6)$	
.86			$SnK_{\beta_2}(4)$
.90			$BaK_{\beta_1}(5)$
.98		$EuL_{\beta_3}(1)$	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
56.02	PtL_{α_2}(2)		BaK_{β_3}(5)
.06		PaL_{α_2}(2)	
.08			ThL_{η} (2)
.10			DyL_{β_1} (1)
.12	HfL_{β_2}(2)		
.14	TaL_{β_1} (2)		
.22		YbL_{ℓ} (1)	
.24		CeK_{β_1}(6)	
.28		DyL_{η} (1)	
.32		MoK_{β_1} (3)	
.34	TaL_{β_6}(2)		
.36	CbK_{β_1} (4)	MoK_{β_3}(3)	
.38		SbK_{α_2}(4), CeK_{β_3}(6)	RuK_{β_1} (3), NdK_{β_2}(6)
.40	LaL_{α_1}(1), NbK_{β_3}(4)		
.42	CsL_{β_4}(1)	CdK_{β_1} (4)	
.44			RuK_{β_3}(3)
.46		PaL_{γ_1}(3)	
.48			DyL_{β_4}(1), PrK_{α_1}(5)
.50		CdK_{β_3}(4)	
.52	InK_{β_2}(6)		
.54		BiL_{β_1} (2)	
.62	LaL_{α_2}(1), RhK_{β_2}(5)		
.64	CdK_{α_1}(5)		
.66	NdL_{ℓ} (1)		
.68		DyL_{α_1} (1)	TmL_{α_1}(1)
.70			SmL_{γ_1}(1)
.74	GaK_{α_1}(2)	BiL_{β_2}(2), MnK_{β_1}(1)	
.78			TaL_{ℓ} (1)
.80		ThL_{α_1}(2)	
.82	CsL_{β_1} (1)		CsK_{β_2}(5)
.92	GaK_{α_2}(2)	PtL_{γ_1}(2)	
.96	HgL_{γ_1}(3)		IK_{α_1}(4)
57.00			TlL_{γ_1} (2)
.02	TaL_{β_4}(2)		
.04		IK_{β_1}(5), DyL_{α_2}(1)	
.06		EuL_{β_1} (1)	
.08			TmL_{α_2}(1)
.10		LaK_{β_2}(6)	
.14	CdK_{α_2}(5)		
.18		IK_{β_3}(5)	
.20	TcK_{α_1}(4)	PmK_{α_1}(6)	
.22	PbL_{ℓ} (2)		SnK_{β_1}(4), TbL_{β_6}(1)
.24		BaK_{α_1}(5)	
.26	IrL_{α_1}(2)	EuL_{β_4}(1)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
57.30			SnK_{β_3}(4)
.32	HfL_{β_3}(2)		PrK_{α_2}(5)
.36		RuK_{α_1}(3)	
.38			GdL_{β_2}(1)
.40	TeK_{α_1}(6)		TbL_{β_3}(1)
.50	TeL_{γ_1}(1)		
.56		ThL_{α_2}(2)	SrK_{α_1}(2)
.58		FeK_{α_1}(1)	
.60	TcK_{α_2}(4)		IK_{α_2}(4)
.66		PbL_{β_3}(2)	
.70		FeK_{α_2}(1)	
.78		RuK_{α_2}(3)	FeK_{β_1}(1), PdK_{α_1}(3)
.80	IrL_{α_2}(2)		
.84	InK_{β_1}(6)		ErL_{η} (1)
.86	RhK_{β_1}(5)		SrK_{α_2}(2)
.88			NdK_{β_1}(6)
.90		SmL_{β_6}(1)	
.92	ErL_{γ_1}(2), InK_{β_3}(6)		
.94	UL_{α_1}(3), RhK_{β_3}(5)		
.96		AgK_{β_2}(4)	
.98		BaK_{α_2}(5)	
58.00		PmK_{α_2}(6)	
.02	TeK_{α_2}(6)		
.04			NdK_{β_3}(6)
.12	LaL_{η} (1)		
.14	LuL_{β_2}(2)		
.18		BiL_{β_4}(2)	
.20		TmL_{l} (1)	
.24		TeK_{β_2}(5)	PdK_{α_2}(3)
.30	ReL_{η} (2)		TcK_{β_2}(3)
.32	HfL_{β_1}(2), HfL_{β_6}(2)	ThL_{γ_1}(3)	CsK_{β_1}(5)
.34	TiK_{α_1}(1)		
.36		SeK_{β_2}(2)	
.38		PrL_{γ_1}(1)	
.40	IL_{β_2}(1)		
.42	TiK_{α_2}(1)	SmL_{β_3}(1)	
.44		CbK_{β_2}(3), SnK_{α_1}(4)	
.46			CsK_{β_3}(5)
.48			TbL_{β_1} (1)
.54		PbL_{β_1}(2), PbL_{β_2}(2)	
.60	ZrK_{β_2}(4)		
.62		LaK_{β_1}(6)	InK_{β_2}(4)
.64	BrK_{β_2}(3)		
.66	CuK_{β_2}(2)		HfL_{l} (1)
.68			PrK_{β_2}(6)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
58.76		LaK_{β_3}(6)	ErL_{α_1}(1)
.78	ULa_2(3)		
.80			TbL_{β_4}(1)
.82	TlL_l (2)		CeK_{α_1}(5)
.86		TbL_{α_1}(1)	
.94			CoK_{α_1}(1)
.96	BaL_{α_1}(1)		
.98	RbK_{α_1}(3)		
59.02		SnK_{α_2}(4)	EuK_{α_1}(6)
.06	AuL_{γ_1}(3), ScK_{β_1}(1)	IrL_{γ_1}(2)	
.08			CoK_{α_2}(1), HgL_{γ_1}(2)
.14	OsL_{α_1}(2)		
.16	PrL_l (1)	SeK_{β_1}(2)	ErL_{α_2}(1)
.18	BaL_{α_2}(1), HfL_{β_4}(2), CuK_{β_1}(2)		
.22		TbL_{α_2}(1)	
.24		BiL_{β_6}(2)	
.28	RbK_{α_2}(3)	AgK_{β_1}(4)	
.32	CdK_{β_2}(6)		
.36		AgK_{β_3}(4)	
.38		NdK_{α_1}(6)	
.48	AgK_{α_1}(5)		
.50	PaL_{α_1}(3), BrK_{β_1}(3)		TcK_{β_1}(3)
.54			TeK_{α_1}(4)
.56		BaK_{β_2}(6)	
.58	LuL_{β_3}(2)	CbK_{β_1}(3)	
.60		SmL_{β_1}(1)	GdL_{β_6}(1)
.62	OsL_{α_2}(2)		
.64		CbK_{β_3}(3)	CeK_{α_2}(5)
.68		SmL_{β_4}(1), TeK_{β_1}(5), TeK_{β_3}(5)	
.70	ZrK_{β_1}(4)	TlL_{β_3}(2)	
.72	RuK_{β_2}(5)		
.74		CsK_{α_1}(5)	
.76	ZrK_{β_3}(4)		
.78			EuL_{β_2}(1)
.88			GdL_{β_3}(1)
.92	BiL_{β_3}(3)		
.98	AgK_{α_2}(5)		
60.00			InK_{β_1}(4)
.06	SbK_{α_1}(6)		EuK_{α_2}(6)
.10			InK_{β_3}(4), UL_{α_1}(2)
.18		PbL_{β_4}(2)	TeK_{α_2}(4)
.28	YbL_{β_2}(2)	NdK_{α_2}(6)	HoL_η (1), PrK_{β_1}(6)
.30		ErL_l (1)	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
60.34	$HoL_{\gamma_1}(2)$, $PaL_{\alpha_2}(3)$, $LuL_{\beta_6}(2)$	$TlL_{\beta_2}(2)$	
.38	$IL_{\beta_6}(1)$		
.42	$MoK_{\alpha_1}(4)$		$PrK_{\beta_3}(6)$
.46		$TcK_{\alpha_1}(3)$	
.48		$CsK_{\alpha_2}(5)$	
.50	$UL_{\beta_3}(4)$		
.52	$WL_{\eta}(2)$		
.54	$HgL_{l}(2)$		
.64	$LuL_{\beta_1}(2)$		$LuL_{l}(1)$
.66		$TlL_{\beta_1}(2)$	
.70	$SbK_{\alpha_2}(6)$		
.72	$CdK_{\beta_1}(6)$		
.74	$SbL_{\gamma_1}(1)$		
.80	$CdK_{\beta_3}(6)$		$RhK_{\alpha_1}(3)$
.82			$BrK_{\beta_2}(2)$
.84	$BiL_{\beta_1}(3)$	$NdL_{\beta_2}(1)$	
.88	$MoK_{\alpha_2}(4)$		
.90		$TcK_{\alpha_2}(3)$	
.98		$SbK_{\beta_2}(5)$	$HoL_{\alpha_1}(1)$, $UL_{\alpha_2}(2)$, $UL_{\gamma_1}(3)$
61.02	$BaL_{\eta}(1)$, $RuK_{\beta_1}(5)$	$PdK_{\beta_2}(4)$	$GdL_{\beta_1}(1)$
.06		$PbL_{\beta_6}(2)$	
.08	$BiL_{\beta_2}(3)$, $ReL_{\alpha_1}(2)$, $RuK_{\beta_3}(5)$		
.14	$ThL_{\alpha_1}(3)$	$BaK_{\beta_1}(6)$	
.16			$CeK_{\beta_2}(6)$
.18	$ZnK_{\alpha_1}(2)$	$GdL_{\alpha_1}(1)$	
.20			$RbK_{\alpha_1}(2)$
.26		$InK_{\alpha_1}(4)$, $CeL_{\gamma_1}(1)$	
.28	$PtL_{\gamma_1}(3)$, $IL_{\beta_3}(1)$	$BaK_{\beta_3}(6)$	$RhK_{\alpha_2}(3)$, $GdL_{\beta_4}(1)$, $AuL_{\gamma_1}(2)$
.30		$GdL_{\eta}(1)$	$LaK_{\alpha_1}(5)$, $SmK_{\alpha_1}(6)$
.32		$OsL_{\gamma_1}(2)$	
.38	$ZnK_{\alpha_2}(2)$		$HoL_{\alpha_2}(1)$
.42	$UL_{\beta_1}(4)$, $LuL_{\beta_4}(2)$		
.46	$TeL_{\beta_2}(1)$		
.52			$RbK_{\alpha_2}(2)$
.54		$GdL_{\alpha_2}(1)$	
.56			$CdK_{\beta_2}(4)$
.60	$ReL_{\alpha_2}(2)$		
.64			$MoK_{\beta_2}(3)$
.70	$CeL_{l}(1)$, $CsL_{\alpha_1}(1)$		
.74			$BrK_{\beta_1}(2)$, $PaL_{\alpha_1}(2)$
.80		$PrK_{\alpha_1}(6)$	
.82		$HgL_{\beta_3}(2)$	
.86		$InK_{\alpha_2}(4)$	
.92	$CsL_{\alpha_2}(1)$		
.98	$ThL_{\alpha_2}(3)$	$ZrK_{\beta_2}(3)$	

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
62.00	YbL_{β_3}(2)		
.06			EuL_{β_6}(1)
.08	PbL_{β_3}(3)		
.14			LaK_{α_2}(5)
.16		CsK_{β_2}(6)	BiL_{β_3}(2)
.18	IL_{β_4}(1)		IK_{β_2}(5), NdL_{γ_1}(1)
.24	YK_{β_2}(4)		
.26		TlL_{β_4}(2)	
.30		HgL_{β_2}(2), BrK_{α_1}(2)	
.32			SbK_{α_1}(4)
.34			SmL_{β_2}(1), SmK_{α_2}(6)
.36	AuL_{ℓ} (2)		
.38		PdK_{β_1}(4)	
.42	AgK_{β_2}(6)		
.46		PdK_{β_3}(4)	
.48		CrK_{β_1}(1)	
.50		SbK_{β_1}(5), SbK_{β_3}(5)	EuL_{β_3}(1)
.52	TmL_{β_2}(2)	HoL_{ℓ} (1)	
.54	PdK_{α_1}(5)		
.58	PaL_{β_3}(4)	BrK_{α_2}(2)	
.60			PaL_{α_2}(2)
.62	BiL_{β_4}(3)		
.64	YbL_{β_6}(2)	AsK_{β_2}(2)	
.72		PrK_{α_2}(6)	
.76	IL_{β_1}(1)		
.78			YbL_{ℓ} (1)
.82			CeK_{β_1}(6)
.84	SeK_{β_2}(3)		
.86			DyL_{η} (1)
.88	TaL_{η} (2)		
.90		HgL_{β_1}(2)	MoK_{β_1} (3)
.94	SnK_{α_1}(6)		MoK_{β_3}(3)
.96		TlL_{β_6}(2)	CeK_{β_3}(6)
.98	DyL_{γ_1}(2)		SbK_{α_2}(4)
63.02			CdK_{β_1}(4)
.04	PbL_{β_1}(3), PbL_{β_2}(3)	MnK_{α_1}(1)	
.06	PdK_{α_2}(5)		
.10	YbL_{β_1}(2)	NdL_{β_6}(1)	CdK_{β_3}(4)
.14	WL_{α_1}(2), TcK_{β_2}(5)		BiL_{β_1}(2)
.16		ZrK_{β_1}(3)	
.18		MnK_{α_2}(1)	
.20		ZrK_{β_3}(3)	
.32			DyL_{α_1}(1)
.38			MnK_{β_1}(1)
.40	YK_{β_1}(4)		BiL_{β_2}(2)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
63.42			PaL_{γ_1}(3)
.44	YK_{β_3}(4)		ThL_{α_1}(2)
.46		AsK_{β_1}(2)	
.52	PaL_{β_1}(4)		
.56	SnK_{α_2}(6), TeL_{β_6}(1)	BiL_{η}(2)	
.60			PtL_{γ_1}(2)
.62	IrL_{γ_1}(3)	PrL_{β_2}(1)	
.68	WL_{α_2}(2)	EuL_{α_1}(1)	
.70		ReL_{γ_1}(2)	
.72	SeK_{β_1}(3)		IK_{β_1}(5)
.74	NiK_{β_2}(2)		DyL_{α_2}(1)
.76			EuL_{β_1}(1)
.80	BiL_{β_6}(3)		LaK_{β_2}(6)
.84	AgK_{β_1}(6)	CsK_{β_1}(6)	
.86	YbL_{β_4}(2)		
.88		NdL_{β_3}(1)	IK_{β_3}(5)
.90			PmK_{α_1}(6)
.92	CbK_{α_1}(4)	MoK_{α_1}(3)	
.94	AgK_{β_3}(6)		
.96		SnK_{β_2}(5)	BaK_{α_1}(5)
.98			EuL_{β_4}(1)
64.02	CsL_{η} (1)	CsK_{β_3}(6), UL_{β_3}(3)	
.04		EuI_{α_2}(1)	
.08	UL_{β_4}(4)		RuK_{α_1}(3)
.14		UL_{l} (2)	
.18		AuL_{β_3}(2)	
.24	PtL_{l} (2)		
.28	NiK_{β_1}(2)		
.30	SnL_{γ_1} (1)		
.32	TlL_{β_3}(3), NbK_{α_2}(4)	RhK_{β_2}(4), CdK_{α_1}(4)	ThL_{α_2}(2)
.34		AuL_{β_2}(2)	FeK_{α_1}(1)
.38		LaL_{γ_1}(1)	
.40		CeK_{α_1}(6)	
.42	LaL_{l} (1)	MoK_{α_2}(3), HgL_{β_4}(2)	
.44	TcK_{β_1}(5)		PbL_{β_3}(2)
.46	TeL_{β_3}(1)		
.48			FeK_{α_2}(1)
.54	TmL_{β_3}(2)		
.56			RuK_{α_2}(3)
.72	UL_{β_2}(4)		SmL_{β_6}(1)
.74	ThL_{β_3}(4)		
.80			AgK_{β_2}(4), BaK_{α_2}(5)
.82	PbL_{β_4}(3), SbL_{β_2}(1)		PmK_{α_2}(6)
.92		CdK_{α_2}(4)	
.94	ErL_{β_2}(2)	DyL_{l} (1), HgL_{β_6}(2)	
.98	TmL_{β_6}(2)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
65.00		UL_{β_1}(3)	
.02	ScK_{α_1}(1)		BiL_{β_4}(2)
.04	TlL_{β_2}(3)		
.06			TmL_{ℓ}(1)
.10			TeK_{β_2}(5)
.12	ScK_{α_2}(1)		
.20			ThL_{γ_1}(3)
.22		NdL_{β_1}(1), NdL_{β_4}(1)	
.24		IK_{α_1}(5), AuL_{β_1}(2)	SeK_{β_2}(2)
.26			PrL_{γ_1}(1)
.30			SmL_{β_3}(1)
.32	TaL_{α_1}(2)		SnK_{α_1}(4)
.34		CeK_{α_2}(6)	CbK_{β_2}(3)
.38	HfL_{η}(2), TlL_{β_1}(3), TeL_{β_4}(1)		
.46			PbL_{β_1}(2), PbL_{β_2}(2)
.52			LaK_{β_1}(6)
.54		SnK_{β_1}(5)	
.64		SnK_{β_3}(5)	
.68			LaK_{β_3}(6)
.70	TbL_{γ_1}(2)		
.72	TmL_{β_1}(2)	PaL_{ℓ}(2)	
.74	ThL_{β_1}(4), PdK_{β_2}(6)		
.76		RhK_{β_1}(4)	
.80	PbL_{β_6}(3)		
.82		PbL_{η}(2)	TbL_{α_1}(1)
.84		RhK_{β_3}(4)	
.86	TaL_{α_2}(2)		
.88	RhK_{α_1}(5)	YK_{β_2}(3)	
66.00		IK_{α_2}(5)	SnK_{α_2}(4)
.02	InK_{α_1}(6)	PrL_{β_6}(1)	
.06	UL_{γ_1}(5)		IrL_{γ_1}(2)
.08	OsL_{γ_1}(3)		
.12	TeL_{β_1}(1)		
.16			SeK_{β_1}(2)
.20	PaL_{β_4}(4)		
.22			TbL_{α_2}(1)
.24	CuK_{α_1}(2)	PaL_{β_3}(3)	BiL_{β_6}(2)
.26		WL_{γ_1}(2)	
.28	SrK_{β_2}(4)		
.30			AgK_{β_1}(4)
.34		SmL_{α_1}(1)	
.40	RhK_{α_2}(5)		AgK_{β_3}(4), NdK_{α_1}(6)
.42	TmL_{β_4}(2), CuK_{α_2}(2)		
.44	CaK_{β_1}(1)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
66.50		PtL_{β_2}(2)	
.56	PaL_{β_2}(4)		
.60			BaK_{β_2}(6)
.62		PtL_{β_3}(2)	
.64	HgL_{β_3}(3)		CbK_{β_1}(3)
.66	InK_{α_2}(6)	CeL_{β_2}(1)	SmL_{β_1}(1)
.68		SeK_{α_1}(2)	
.70		SmL_{α_2}(1)	CbK_{β_3}(3)
.76			TeK_{β_1}(5), TeK_{β_3}(5), SmL_{β_4}(1)
.78			TlL_{β_3}(2)
.80	MoK_{β_2}(5)	AuL_{β_4}(2)	
.82			CsK_{α_1}(5)
.94		PrL_{β_2}(1)	
.96		SeK_{α_2}(2)	
67.00		SmL_{η}(1)	
.04	SbL_{β_6}(1)		
.10		AuL_{β_6}(2)	
.12	TlL_{β_4}(3)	YK_{β_1}(3)	
.16	HgL_{β_2}(3), BrK_{α_1}(3)	YK_{β_3}(3)	
.18		LaK_{α_1}(6)	
.22		InK_{β_2}(5)	
.24	ErL_{β_3}(2)		
.26	PdK_{β_1}(6)	PaL_{β_1}(3)	
.32			PbL_{β_4}(2)
.34	PdK_{β_3}(6)		
.38		ThL_{l}(2)	
.44			NdK_{α_2}(6)
.46	BrK_{α_2}(3), SrK_{β_1}(4)		ErL_{l}(1)
.50		GeK_{β_2}(2), TbL_{l}(1)	
.52	HoL_{β_2}(2), ErL_{β_6}(2), SrK_{β_3}(4)		TlL_{β_2}(2)
.54	BaL_{l}(1), AsK_{β_2}(3)		
.64	HfL_{α_1}(2)	AgK_{α_1}(4)	
.66			TcK_{α_1}(3), CsK_{α_2}(5)
.68		NbK_{α_1}(3)	
.72		PtL_{β_1}(2)	
.76	ZrK_{α_1}(4)	BaL_{γ_1}(1)	
.82	HgL_{β_1}(3)		
.86	IL_{α_1}(1)	UL_{β_4}(3)	
.88	TlL_{β_6}(3)		TlL_{β_1}(2)
.94		RuK_{β_2}(4)	
.96	SbL_{β_3}(1)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
68.00	UL_{β_6}(4)		
.02	LuL_{η} (2)		
.08			NdL_{β_2}(1)
.10	IL_{α_2}(1)		
.12		CbK_{α_2}(3), LaK_{α_2}(6)	
.16	HfL_{α_2}(2)		TcK_{α_2}(3)
.18	ZrK_{α_2}(4)	IK_{β_2}(6)	
.20	InL_{γ_1}(1), MoK_{β_1}(5)		
.22		PrL_{β_4}(1)	
.24		AgK_{α_2}(4)	SbK_{β_2}(5)
.26	MoK_{β_3}(5)	TlL_{η} (2)	
.30		TeK_{α_1}(5)	PdK_{β_2}(4)
.34		GeK_{β_1}(2)	PbL_{β_6}(2)
.36		PrL_{β_1}(1)	
.38	PaL_{γ_1}(5)		
.44	AsK_{β_1}(3)		BaK_{β_1}(6)
.48	ErL_{β_1}(2)		GdL_{α_1}(1)
.50	ThL_{β_2}(4), ThL_{β_4}(4)		
.52	SnL_{β_2}(1)		
.54	BiL_{η} (3)	UL_{β_2}(3)	
.56		ThL_{β_3}(3)	
.58			InK_{α_1}(4), CeL_{γ_1}(1)
.60			BaK_{β_3}(6)
.62			GdL_{η} (1)
.64			OsL_{γ_1}(2)
.72	ReL_{γ_1} (3)		
.74	GdL_{γ_1}(2)		
.78		IrL_{β_2}(2)	
.84		InK_{β_1}(5)	
.90			GdL_{α_2}(1)
.92	SbL_{β_4}(1)		
.96		InK_{β_3}(5), TaL_{γ_1}(2)	
69.08		TeK_{α_2}(5)	
.12	ErL_{β_4}(2)		
.16		CeL_{β_6}(1), IrL_{β_3}(2)	
.18	UL_{γ}(3)		
.20			PrK_{α_1}(6)
.22	AuL_{β_3}(3)		HgL_{β_3}(2)
.24			InK_{α_2}(4)
.26		VK_{β_1}(1), PtL_{β_4}(2)	
.34		PtL_{β_6}(2)	
.36		BiL_{α_1}(2)	
.40	AuL_{β_2}(3), RhK_{β_2}(6), CdK_{α_1}(6)		ZrK_{β_2}(3)
.44		CrK_{α_1}(1)	
.46		RuK_{β_1}(4)	
.50	HgL_{β_4}(3)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
69.52	$RuK\alpha_1$(5)		
.54		$RuK\beta_3$(4)	
.58		$CrK\alpha_2$(1)	
.62			$CsK\beta_2$(6)
.64		$ThL\beta_1$(3)	
.66	$UL\eta$ (4)		
.72			$TlL\beta_4$(2)
.76	$SbL\beta_1$(1)		$BrK\alpha_1$(2)
.78			$HgL\beta_2$(2)
.86			$PdK\beta_1$(4)
.88		$LaL\beta_2$(1)	
.92	$PaL\beta_6$(4)	$IK\beta_1$(6)	
.96			$PdK\beta_2$(4)
.98			$CrK\beta_1$ (1)
70.00			$SbK\beta_1$(5), $SbK\beta_3$(5)
.02			HoL_l (1)
.04	$CdK\alpha_2$(6)		
.06	$HgL\beta_6$(3), $RuK\alpha_2$(5)		
.08	$LuL\alpha_1$(2)	$IK\beta_3$(6)	$BrK\alpha_2$(2)
.10	$HoL\beta_3$(2)		
.14		$PaL\beta_4$(3)	
.16	$CoK\beta_1$(2)	$CeL\beta_3$(1), $BiL\alpha_2$(2), $BaK\alpha_1$(6)	
.18			$AsK\beta_2$(2)
.22		GdL_l (1)	
.24	$HoL\beta_6$(2)	$SrK\beta_2$(3)	
.26			$PrK\alpha_2$(6)
.28	$DyL\beta_2$(2)		
.34		$IrL\beta_1$(2)	
.40	$AuL\beta_1$(3)		
.44	$BiL\gamma_1$(4)		$HgL\beta_1$(2)
.54		$PaL\beta_2$(3)	$TlL\beta_6$(2)
.60	$LuL\alpha_2$(2)		
.62			$MnK\alpha_1$(1)
.66	ReL_l (2)		
.68		$CdK\beta_2$(5)	
.70			$NdL\beta_6$ (1)
.74	$ThL\gamma_1$(5)		
.76		$HgL\eta$ (2)	$ZrK\beta_1$ (3)
.78	$RbK\beta_2$(4), CsL_l (1)		$MnK\alpha_2$(1)
.82			$ZrK\beta_3$(3)
.84	$YbL\eta$ (2)		
.86	$SnL\beta_6$(1)		
.88	$CbK\beta_2$(5)		
.94	PaL_l (3)		
.98	$RhK\beta_1$(6)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
71.04	PbL_{η} (3)		
.06	RhK_{β_3}(6)		
.12		BaK_{α_2}(6)	
.14			AsK_{β_1}(2)
.22			BiL_{η} (2)
.26		PdK_{α_1}(4)	
.28		OsL_{β_2}(2)	
.30			PrL_{β_2}(1)
.34	TeL_{α_1}(1)		
.36			EuL_{α_1}(1)
.40			ReL_{γ_1}(2)
.44		TeK_{β_2}(6), CsL_{γ_1}(1)	
.46	HoL_{β_1}(2)		
.50		SrK_{β_1}(3), CeL_{β_4}(1)	
.52	WL_{γ_1}(3)		
.54		PbL_{α_1}(2)	
.56	TeL_{α_2}(1)	SrK_{β_3}(3)	CsK_{β_1}(6)
.58			NdL_{β_3}(1)
.60		AsK_{α_1}(2), SbK_{α_1}(5)	
.64			MoK_{α_1}(3)
.68			SnK_{β_2}(5)
.74		CeL_{β_1}(1), IrL_{β_6}(2)	CsK_{β_3}(6), UL_{β_3}(3)
.78	PtL_{β_2}(3), SnL_{β_3}(1)		EuL_{α_2}(1)
.82		ZrK_{α_1}(3), HfL_{γ_1}(2)	
.86		IrL_{β_4}(2)	
.88		PdK_{α_2}(4), AsK_{α_2}(2)	
.90			UL_{l} (2)
.92	PtL_{β_3}(3)		
.94	ThL_{β_6}(4)		AuL_{β_3}(2)
.96		TcK_{β_2}(4)	
72.00	SeK_{α_1}(3), RbK_{β_1}(4)		
.02	EuL_{γ_1}(2), NiK_{α_1}(2), YK_{α_1}(4)		
.06	HoL_{β_4}(2), RbK_{β_3}(4)		
.08	PaL_{η}(4)	UL_{β_6}(3)	
.12	AuL_{β_4}(3)		RhK_{β_2}(4), CdK_{α_1}(4), AuL_{β_2}(2)
.16			LaL_{γ_1}(1)
.20			CeK_{α_1}(6)
.22	NiK_{α_2}(2)		MoK_{α_2}(3), HgL_{β_4}(2)
.26		ZrK_{α_2}(3), NdL_{α_1}(1)	
.30	SeK_{α_2}(3)		
.34	CbK_{β_1}(5)		
.36		PbL_{α_2}(2)	
.40		SbK_{α_2}(5)	
.42		CdK_{β_1}(5)	
.44	YK_{α_2}(4), CbK_{β_3}(5)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
72.46	AuL_{β_6}(3)		
.50	CdL_{γ_1}(1)		
.56		CdK_{β_3}(5), LaL_{β_6}(1)	
.58	InL_{β_2}(1)		
.62		NdL_{α_2}(1), ThL_{β_2}(3), ThL_{β_4}(3)	
.70	YbL_{α_1}(2)		
.72	SnL_{β_4}(1)		
.76	ThL_{ℓ}(3)		
.80			CdK_{α_2}(4)
.82			DyL_{ℓ}(1), HgL_{β_6}(2)
.88	GeK_{β_2}(3)		
.90			UL_{β_1}(3)
73.04		GaK_{β_2}(2)	
.06	WL_{ℓ}(2), AgK_{α_1}(6)		
.10	CaK_{α_1}(1)		
.12	PbL_{γ_1}(4), PtL_{β_1}(3)	OsL_{β_1}(2)	
.14		EuL_{ℓ}(1)	NdL_{β_1}(1), NdL_{β_4}(1)
.16			AuL_{β_1}(2)
.18	CaK_{α_2}(1)		IK_{α_1}(5)
.20	DyL_{β_3}(2), DyL_{β_6}(2)		
.26	TbL_{β_2}(2), YbL_{α_2}(2)		
.28			CeK_{α_2}(6)
.34		TeK_{β_1}(6), TeK_{β_3}(6)	
.38	RuK_{β_2}(6)		
.40		CsK_{α_1}(6)	
.46		BaL_{β_2}(1)	
.48	TcK_{α_1}(5)		
.50		AuL_{η} (2)	
.52		TcK_{β_1}(4)	SnK_{β_1}(5)
.64		NdL_{η} (1)	SnK_{β_3}(5)
.68		LaL_{β_3}(1)	
.72	TlL_{η} (3), AgK_{α_2}(6)		
.74			PaL_{ℓ} (2)
.76	SnL_{β_1}(1)		RhK_{β_1}(4)
.78		ReL_{β_2}(2)	
.82	GeK_{β_1}(3)		
.84		TlL_{α_1}(2)	PbL_{η} (2)
.86		GaK_{β_1}(2), UL_{η} (3)	
.88			RhK_{β_3}(4)
.92			YK_{β_2}(3)
.94	TmL_{η} (2)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
74.04	$TcK\alpha_2$(5)		
.06			$IK\alpha_2$(5)
.08			$PrL\beta_6$(1)
.14		$PaL\beta_6$(3)	
.30	$IrL\beta_2$(3)		
.34			$WL\gamma_1$(2), $PaL\beta_3$(3)
.36		$CsK\alpha_2$(6)	
.44		$UL\gamma_1$(4)	$SmL\alpha_1$(1)
.50	$TaL\gamma_1$(3)		
.56		$AgK\beta_2$(5)	
.62	$ThL\eta$ (4)		$PtL\beta_2$(2)
.64		$TlL\alpha_2$(2)	
.66	$DyL\beta_1$(2)		
.70		$BiL\gamma_1$(3)	
.72	$IrL\beta_3$(3)		
.74		$ReL\beta_3$(2)	
.78			$PtL\beta_3$(2)
.80			$CeL\beta_2$(1)
.84	$PtL\beta_4$(3)		$SeK\alpha_1$(2)
.86			$SmL\alpha_2$(1)
.92	$PtL\beta_6$(3)		
.94		$LuL\gamma_1$(2)	
.96	$BiL\alpha_1$(3)		
.98			$AuL\beta_4$(2)
75.00		$SbK\beta_2$(6)	
.04	$InL\beta_6$(1)		
.06	$RuK\beta_1$(6)	$LaL\beta_4$(1)	
.08		$RbK\beta_2$(3)	
.14	$SbL\alpha_1$(1), $RuK\beta_3$(6)		$PrL\beta_3$(1)
.16			$SeK\alpha_2$(2)
.18	$DyL\beta_4$(2)		
.20		$SnK\alpha_1$(5)	$SmL\eta$ (1)
.22		$RhK\alpha_1$(4)	
.34			$YK\beta_1$(3), $AuL\beta_6$(2)
.38	$SbL\alpha_2$(1)		
.40		$LaL\beta_1$(1)	
.42	$ZrK\beta_2$(5)		$YK\beta_3$(3)
.44		$UL\gamma_1$(4)	$LaK\alpha_1$(6)
.46			$InK\beta_2$(5)
.50	$TmL\alpha_1$(2)		
.52	$SmL\gamma_1$(2)		$PaL\beta_1$(3)
.54	$KK\beta_1$(1)		
.56		$PrL\alpha_1$(1)	
.62	$TaL\ell$ (2)		
.66			$ThL\ell$ (2)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
75.80			GeK_{β_2}(2), TbL_{ζ}(1)
.84	BiL_{α_2}(3)	RhK_{α_2}(4)	
.92	InL_{β_3}(1)	PrL_{α_2}(1)	
.94	TlL_{γ_1}(4)		
.96			AgK_{α_1}(4)
76.00		SnK_{α_2}(5)	CbK_{α_1}(3)
.04	IrL_{β_1}(3)		PtL_{β_1}(2)
.08	TmL_{α_2}(2)	ReL_{β_1}(2)	
.12			BaL_{γ_1}(1)
.20			UL_{β_4}(3)
.26	TbL_{β_6}(2)	SmL_{ζ}(1), HgL_{α_1}(2), BaL_{β_6}(1)	
.32		MoK_{β_2}(4)	RuK_{β_2}(4)
.34		ThL_{β_6}(3)	
.36		AgK_{β_1}(5)	
.38		PtL_{η} (2)	
.40		RbK_{β_1}(3)	
.42		YK_{α_1}(3)	
.46		RbK_{β_3}(3)	
.50	GdL_{β_2}(2)	WL_{β_2}(2), PaL_{η}(3), AgK_{β_3}(5)	CbK_{α_2}(3)
.52	TbL_{β_3}(2), HgL_{η}(3)		LaK_{α_2}(6)
.58			IK_{β_2}(6)
.64			PrL_{β_4}(1)
.66			AgK_{α_2}(4)
.68			TlL_{η} (2)
.72			TeK_{α_1}(5)
.76	SrK_{α_1}(4)		
.78			GeK_{β_1}(2)
.80			PrL_{β_1}(1)
.88	InL_{β_4}(1)	YK_{α_2}(3)	
.94	ZrK_{β_1}(5)		
.96		ReL_{β_6}(2)	
77.00		SbK_{β_1}(6), SbK_{β_3}(6)	
.02	ZrK_{β_3}(5)		ThL_{β_3}(3), UL_{β_2}(3)
.04		VK_{α_1}(1)	
.06	FeK_{β_1}(2), PdK_{α_1}(6)	HgL_{α_2}(2)	
.08	OsL_{β_2}(3), CdL_{β_2}(1)		
.16	ErL_{η} (2)	VK_{α_2}(1)	
.18		GeK_{α_1}(2)	
.20	SrK_{α_2}(4)		
.28			IrL_{β_2}(2)
.30	AgL_{γ_1}(1)		
.32		CsL_{β_2}(1)	
.34		PrL_{η} (1)	
.36	PbL_{α_1}(3)		InK_{β_1}(5)
.42		TiK_{β_1}(1)	
.44	AsK_{α_1}(3)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
77.48		$GeK\alpha_2$(2)	$InK\beta_3$(5)
.50		$BaL\beta_3$(1)	$TaL\gamma_1$(2)
.54			$IrL\beta_3$(2)
.56		$ReL\beta_4$(2)	
.60	$IrL\beta_6$(3)	$PbL\gamma_1$(3)	
.64			$TeK\alpha_2$(5)
.68	$HfL\gamma_1$(3)		
.72	$IrL\beta_4$(3)		
.74	$AsK\alpha_2$(3), $PdK\alpha_2$(6)		$CeL\beta_6$(1)
.82		$WL\beta_3$(2)	
.84	$TcK\beta_2$(6)		$VK\beta_1$(1), $PtL\beta_4$(2)
.94	$MoK\alpha_1$(5)		$PtL\beta_6$(2)
.98		$MoK\beta_1$(4)	$BiL\alpha_1$(2)
78.04	$UL\beta_3$(5)	$MoK\beta_3$(4)	
.06			$CrK\alpha_1$(1)
.08			$RuK\beta_1$(4)
.10	$TbL\beta_1$(2)		
.16	$InL\beta_1$(1)		
.18		$YbL\gamma_1$(2)	$RuK\beta_3$(4)
.20	IL_l(1)	$PaL\gamma_1$(4)	
.22			$CrK\alpha_2$(1)
.28	$PbL\alpha_2$(3)		
.30			$ThL\beta_1$(3)
.34	HfL_l(2)		
.50	$ErL\alpha_1$(2)		
.56	$TbL\beta_4$(2)		
.58	$MoK\alpha_2$(5)		
.60			$LaL\beta_2$(1)
.62			$IK\beta_1$(6)
.76	$CoK\alpha_1$(2)		
.78		$PdK\beta_2$(5)	
.82			$IK\beta_3$(6)
.84		$AuL\alpha_1$(2)	
.88			$PaL\beta_4$(3)
.90			$BaK\alpha_1$(6)
.92		$SnK\beta_2$(6), $BaL\beta_4$(1)	$CeL\beta_3$(1), $BiL\alpha_2$(2)
.96	$HgL\gamma_1$(4), $CoK\alpha_2$(2)		GdL_l(1)
79.00			$SrK\beta_2$(3)
.04	$GaK\beta_2$(3)		
.08	$ErL\alpha_2$(2)		
.10			$IrL\beta_1$(2)
.12	$OsL\beta_1$(3)	$InK\alpha_1$(5)	
.16		$CeL\alpha_1$(1)	
.24		$WL\beta_1$(2), $ThL\eta$ (3)	
.32	$SnL\alpha_1$(1)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
79.34	UL_{β_1}(5)		PaL_{β_2}(3)
.38		ZnK_{β_2}(2), BaL_{β_1}(1)	
.42		IrL_{η} (2)	
.44		TaL_{β_2}(2)	
.50		CeL_{α_2}(1)	
.52	SbL_{η} (1)		CdK_{β_2}(5)
.56	AuL_{η} (3), SnL_{α_2}(1)	RuK_{α_1}(4)	
.58	TcK_{β_1}(6)		
.62			HgL_{η} (2)
.68		AuL_{α_2}(2)	
.70	GdL_{β_6}(2)		
.72	CdL_{β_6}(1)		
.82		WL_{β_6}(2)	
.86	ReL_{β_2}(3)		
.92	TlL_{α_1}(3)		
.94	GaK_{β_1}(3)	InK_{α_2}(5)	
.96	EuL_{β_2}(2)	IL_{γ_1}(1)	
80.02			BaK_{α_2}(6)
.12	GdL_{β_3}(2)		
.20		RuK_{α_2}(4)	PdK_{α_1}(4)
.22			OsL_{β_2}(2)
.24		ZnK_{β_1}(2)	
.32		CsL_{β_6}(1)	
.42			TeK_{β_2}(6), CsL_{γ_1}(1)
.46	UL_{α_1}(4)		
.48	YK_{β_2}(5)		SrK_{β_1}(3), CeL_{β_4}(1)
.50	CdL_{β_3}(1)		
.52			PbL_{α_1}(2)
.54			SrK_{β_3}(3)
.60			AsK_{α_1}(2), SbK_{α_1}(5)
.62		IK_{α_1}(6)	
.68		TlL_{γ_1}(3)	
.70	HoL_{η} (2)	PdK_{β_1}(5), WL_{β_4}(2)	
.76			CeL_{β_1}(1), IrL_{β_6}(2)
.80		PdK_{β_3}(5)	
.82	TlL_{α_2}(3)		
.84			ZrK_{α_1}(3), HfL_{γ_1}(2)
.90			PdK_{α_2}(4), IrL_{β_4}(2)
.94	ReL_{β_3}(3)		AsK_{α_2}(2)
.96	PaL_{β_3}(5)		
81.00			TcK_{β_2}(4)
.02		SnK_{β_1}(6)	
.04		ThL_{γ_1}(4)	
.10		TaL_{β_3}(2)	
.16	LuL_{γ_1}(3)	SnK_{β_3}(6)	UL_{β_6}(3)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
81.22	LuL_l (2)	CbK_{β_2}(4)	
.34		CeL_η (1)	
.36			NdL_{α_1}(1)
.38			ZrK_{α_2}(3)
.46	RhK_{α_1}(6)		
.48			PbL_{α_2}(2)
.50	BrK_{β_2}(4)		
.52	CdL_{β_4}(1)		SbK_{α_2}(5)
.56		SrK_{α_1}(3), PtL_{α_1}(2)	CdK_{β_1}(5)
.62		IK_{α_2}(6)	
.66		CsL_{β_3}(1)	
.70	UL_{γ_1}(6)		
.72	HoL_{α_1}(2)		CdK_{β_3}(5), LaL_{β_6}(1)
.74	UL_{α_2}(4)		
.76		TmL_{γ_1}(2)	
.78			NdL_{α_2}(1)
.80	GdL_{β_1}(2)		ThL_{β_2}(3), ThL_{β_4}(3)
.82		BiL_l (2)	
82.04	AgL_{β_2}(1)	SrK_{α_2}(3)	
.08	RbK_{α_1}(4)		
.10	YK_{β_1}(5)		
.16	GdL_{β_4}(2), AuL_{γ_1}(4), RhK_{α_2}(6)		
.18	YK_{β_3}(5)		
.30	PaL_{β_1}(5)		GaK_{β_2}(2)
.32	HoL_{α_2}(2)		
.38			OsL_{β_1}(2)
.40			EuL_l(1)
.42	ReL_{β_1}(3)	PtL_{α_2}(2)	
.48	TeL_l (1)		
.52	RbK_{α_2}(4)		
.58		HfL_{β_2}(2)	
.62		TaL_{β_1}(2)	
.64	HgL_{α_1}(3)		TeK_{β_1}(6), TeK_{β_3}(6)
.66	PdL_{γ_1}(1)		
.70	MoK_{β_2}(6)		
.72			CsK_{α_1}(6)
.78	PtL_η (3)		BaL_{β_2}(1)
.84	BrK_{β_1}(4), NbK_{α_1}(5)		TcK_{β_1}(4), AuL_η (2)
.86	PaL_{α_1}(4)		
.92	WL_{β_2}(3)		
.94		TaL_{β_4}(2)	
.96		CbK_{β_1}(4)	
.98			NdL_η (1)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
83.02	CdL_{β_1}(1)		
.04			LaL_{β_3}(1)
.06		CbK_{β_3}(4), LaL_{α_1}(1)	
.08	UL_{β_4}(5)	CsL_{β_4}(1)	
.12	KK_{α_1}(1)		
.16			ReL_{β_2}(2)
.22	KK_{α_2}(1)		
.24		InK_{β_2}(6)	GaK_{β_1}(1), TlL_{α_1}(2), UL_η (3)
.32	EuL_{β_6}(2)		
.40	ReL_{β_6}(3)	LaL_{α_2}(1)	
.42	CbK_{α_2}(5)	RhK_{β_2}(5)	
.44		CdK_{α_1}(5)	
.46		NdL_l(1)	
.48	BiL_{β_3}(4)		
.50	NdL_{γ_1}(2)		
.52	HgL_{α_2}(3)		
.60			PaL_{β_6}(3)
.62		GaK_{α_1}(2)	
.66	GeK_{α_1}(3)		
.74		CsL_{β_1}(1)	
.86			CsK_{α_2}(6)
.90		GaK_{α_2}(2)	
.94	InL_{α_1}(1)		
.98	EuL_{β_3}(2), UL_{β_2}(5), GeK_{α_2}(3)	HgL_{γ_1}(3)	
84.00	ThL_{β_3}(5)		
.06		TaL_{β_4}(2)	
.08	ReL_{β_4}(3)		
.10			AgK_{β_2}(5)
.14	PaL_{α_2}(4)		
.18	InL_{α_2}(1)		TlL_{α_2}(2)
.26			BiL_{γ_1}(3)
.28		CdK_{α_2}(5)	
.30			ReL_{β_3}(2)
.34		TcK_{α_1}(4)	
.38	YbL_l(2), WL_{β_3}(3)		
.40		PbL_l(2)	
.44	SnL_η (1)		
.48		IrL_{α_1}(2)	
.50	DyL_η (2)		
.54			LuL_{γ_1}(2)
.56	MoK_{β_1}(6)		
.58		HfL_{β_3}(2)	
.62			SbK_{β_2}(6)
.64	MoK_{β_3}(6)		
.68		TeK_{α_1}(6)	LaL_{β_4}(1)

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
84.70			RbK_{β_2}(3)
.78	YbL_{γ_1}(3)		
.80	PaL_{γ_1}(6)		
.84			SnK_{α_1}(5)
.86		TeL_{γ_1}(1)	RhK_{α_1}(4)
.90	AgL_{β_4}(1)		
.94	BiL_{β_1}(4)		
85.02		TcK_{α_2}(4)	
.08			LaL_{β_1}(1)
.12			UL_{γ_1}(4)
.20	DyL_{α_1}(2)		
.26			PrL_{α_1}(1)
.28	MnK_{β_1}(2)		
.30	BiL_{β_2}(4)		
.36		IrL_{α_2}(2)	
.38	ThL_{α_1}(4)		
.44	ThL_{β_1}(5)	InK_{β_1}(6)	
.48		RhK_{β_1}(5)	
.54	AuL_{α_1}(3)		
.56		ErL_{γ_1}(2)	
.58		RhK_{β_3}(5), InK_{β_3}(6)	
.60	PtL_{γ_1}(4)	UL_{α_1}(3)	RhK_{α_2}(4)
.62	AgL_{β_3}(1)		
.70			PrL_{α_2}(1)
.74		TeK_{α_2}(6)	
.80	DyL_{α_2}(2)		SnK_{α_2}(5)
.84	EuL_{β_1}(2)		
.88			ReL_{β_1}(2)
.92		LaL_{η}(1)	
.94		LuL_{β_2}(2)	
.98	WL_{β_1}(3)		
86.10	PaL_{β_4}(5)		BaL_{β_6}(1), SmL_{γ}(1), HgL_{α_1}(2)
.14	ZnK_{β_2}(3)		
.16	EuL_{β_4}(2)		
.18			MoK_{β_2}(4), ThL_{β_6}(3)
.20	TaL_{β_2}(3), IrL_{η}(3)	ReL_{η}(2)	
.22	SrK_{β_2}(5)		AgK_{β_1}(5)
.24		HfL_{β_1}(2), HfL_{β_6}(2)	
.26			PtL_{η}(2)
.28		TiK_{α_1}(1)	RbK_{β_1}(3), YK_{α_1}(3)
.34			RbK_{β_3}(3)
.38	RuK_{α_1}(6)	IL_{β_2}(1)	AgK_{β_3}(5), PaL_{η}(3)
.40			WL_{β_2}(2)
.42		TiK_{α_2}(1)	
.46	AuL_{α_2}(3)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
86.62	PaL_{β_2}(5)		
.64	WL_{β_6}(3), AgL_{β_4}(1)		
.70	ThL_{α_2}(4)	ZrK_{β_2}(4)	
.72	FeK_{α_1}(2)		
.76		BrK_{β_2}(3)	
.80		CuK_{β_2}(2)	
.84			YK_{α_2}(3)
.86	PbL_{β_3}(4)		
.94	FeK_{α_2}(2)		ReL_{β_6}(2)
87.00			SbK_{β_1}(6), SbK_{β_3}(6)
.02		UL_{α_2}(3)	VK_{α_1}(1)
.04			HgL_{α_2}(2)
.08	RuK_{α_2}(6)	TlL_{ℓ}(2)	
.10	ZnK_{β_1}(3)		
.16	SbL_{ℓ}(1)		
.18			VK_{α_2}(1)
.20			GeK_{α_1}(2)
.26			TiK_{β_1}(1)
.30	SmL_{β_6}(2)		
.32		BaL_{α_1}(1)	
.36		RbK_{α_1}(3)	
.38			CsL_{β_2}(1)
.40			PrL_{η}(1)
.48		ScK_{β_1}(1), AuL_{γ_1}(3)	
.56			GeK_{α_2}(2)
.58			BaL_{β_3}(1)
.62	WL_{β_4}(3)	OsL_{α_1}(2)	
.64			ReL_{β_4}(2)
.66		PrL_{ℓ}(1), HfL_{β_4}(2)	
.68		CuK_{β_1}(2), BaL_{α_2}(1)	
.70			PbL_{γ_1}(3)
.74	BiL_{β_4}(4)		
.76	PdL_{β_2}(1)		
.78	TmL_{ℓ}(2)		
.86		RbK_{α_2}(3)	
.92	SrK_{β_1}(5)	CdK_{β_2}(6)	
.96			WL_{β_3}(2)
88.00	SrK_{β_3}(5)		
.02	ThL_{γ_1}(6)		
.06	SeK_{β_2}(4)		
.08	TaL_{β_3}(3)		
.12	PrL_{γ_1}(2)		
.16			MoK_{β_1}(4)
.18		AgK_{α_1}(5)	
.20	CbK_{β_2}(6)		

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TABLE 7. - Degrees 2θ for characteristic K and L spectral lines when using the three analyzers, NaCl, LiF, and Quartz (Con.)

	NaCl	LiF	Quartz
88.24		BrK_{β_1} (3), PaL_{α_1} (3)	MoK_{β_3} (4)
.34	ZrK_{α_1} (5)		
.38		LuL_{β_3} (2)	
.40	PbL_{β_1} (4), PbL_{β_2} (4)		YbL_{γ_1} (2)
.42		OsL_{α_2} (2)	PaL_{γ_1} (4)
.48	AgL_{β_1} (1)		
.56		ZrK_{β_1} (4)	
.62	PtL_{α_1} (3)	RuK_{β_2} (5)	
.64		ZrK_{β_3} (4)	
.70	UL_{β_6} (5)		
.74	RhL_{γ_1} (1)		
.82	TmL_{γ_1} (3)		
.90	BiL_{ℓ} (3)		
.92		BiL_{β_3} (3)	
.94	ZrK_{α_2} (5)		
89.00	TbL_{α_1} (2)		
.06		AgK_{α_2} (5)	
.08	CdL_{α_1} (1)		
.12			PdK_{β_2} (5)
.16		SbK_{α_1} (6)	
.18			AuL_{α_1} (2)
.28			SnK_{β_2} (6)
.30	IrL_{γ_1} (4)		BaL_{β_4} (1)
.34	CdL_{α_2} (1)		
.42	ThL_{β_2} (5), ThL_{β_4} (5)		
.46	SeK_{β_1} (4)		
.54			InK_{α_1} (5)
.56	TbL_{α_2} (2), PtL_{α_2} (3)	YbL_{β_2} (2)	CeL_{α_1} (1)
.58	BiL_{β_6} (4)		
.66		HoL_{γ_1} (2), PaL_{α_2} (3)	WL_{β_1} (2), ThL_{η} (3)
.68		LuL_{β_6} (2)	
.74		IL_{β_6} (1)	
.76	HfL_{β_2} (3)		
.78		MoK_{α_1} (4)	
.80	TaL_{β_1} (3)		
.84			ZnK_{β_2} (2), BaL_{β_1} (1)
.90			TaL_{β_2} (2), IrL_{η} (2)
.92		UL_{β_3} (4)	
.98		WL_{η} (2)	CeL_{α_2} (1)
90.00		HgL_{ℓ} (2)	

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